New Fiat Ducato 2016

Converters' and Upfitters' Manual

FOREWORD

This publication gives the information, features and instructions for vehicle fitting out and conversion and is addressed to qualified, specialist personnel.
The coach builder is responsible for the fitting-out or conversion project and its execution, and must guarantee compliance with standards given in this publication in addition to all other applicable standards.
Before undertaking any works, make certain to have the publication on the vehicle model on which the works are to be done, as well as all the required accident prevention equipment, which, for information, includes goggles, hard hat, safety shoes, etc., in addition to all necessary tools, lifting and transport gear, etc. The equipment and tools must all be available and efficient, and the vehicle itself must be in condition to permit safe execution of the works.
When carrying out the works the coach builder must strictly adhere to the instructions given in the publication, using the components described, and guarantee that the works carried out are technically correct.

Any modification, conversion or other operation not foreseen in the manual, and not explicitly authorised by FIAT CHRYSLER AUTOMOBILES S.p.A. in writing shall relieve FIAT of any liability, and specifically, if the vehicle is covered by warranty, this shall be immediately forfeit.

FIAT CHRYSLER AUTOMOBILES S.p.A. is available to provide any clarification necessary for execution of the works, as well as instructions for any cases or situations not specifically foreseen in this publication.
The functional, efficiency and safety conditions foreseen by FIAT CHRYSLER AUTOMOBILES S.p.A. must be restored immediately after any conversion works. Contact the FIAT CHRYSLER AUTOMOBILES S.p.A. network for any necessary vehicle tuning.
FIAT CHRYSLER AUTOMOBILES S.p.A. shall not be held liable for the effective execution of the conversion or fittingout works.
The data and information contained in this publication may not be up to date as a result of the alterations that FIAT CHRYSLER AUTOMOBILES S.p.A. reserves the right to make at any time for technical or commercial reasons, or for the need to adapt the vehicle to the requirements of specific local laws.

In case of discrepancy between the contents of this publication and the effective condition of the vehicle, please contact FIAT CHRYSLER AUTOMOBILES S.p.A. before proceeding with any works.

Symbols - Warnings

Hazard to personal safety
Serious hazard to personal safety in case of failure to fully comply with these instructions.

Risk of damage to vehicle
Serious risk of vehicle damage, warranty forfeit, in case of failure to fully comply with these instructions.

General hazard
Combines the risks of the two symbols described above.

Respect the environment
Indicates behaviour code for use of the vehicle in the most environmentally friendly manner possible.

NOTE: Provides any necessary additional information.

AUTHORISATION

Observance of the instructions contained in this manual does not oblige the manufacturer to grant authorisation.
The conversion coach builder must ask the manufacturer for authorisation by sending the appropriate documentation (see sections below) to the following address:
- FIAT CHRYSLER AUTOMOBILES S.p.A.
- FIAT PROFESSIONAL
- MERCATO ITALIA - SERVIZIO ALLESTITORI
  (Italian Market - Coach-builders Service)
  Corso Agnelli 200
  1° piano ufficio B56
  (1st floor, office B56)

In order to grant authorisation, the manufacturer reserves the right to demand that the conversion coach builder carry out any test or verification considered necessary.

AUTHORISATION “NULLA OSTA”

Compliance with the indications contained in this manual does not oblige the Manufacturer to grant authorisation.
The Manufacturer reserves the right to ask the Converter to carry out the tests and trials deemed needed for obtaining authorisation.

DOCUMENTS NEEDED FOR AUTHORISATION

List of documents needed to obtain authorisation:

Documents for the Local Motor Vehicle Registration Office for test request.

The amount of copies to be sent to us (two copies if on paper, one copy if electronic) and the amount of copies needed by the Registration Office.

a. Sketch of the converted vehicle with indication of main dimensions (height, length, width, wheelbase, overhangs, empty vehicle ground clearance). The converted vehicle drawing must include four views on one sheet, normally on 1:20 scale (without indications of structures or calculations checks). Drawings on different scales may be accepted providing they are specifically requested by the Local Vehicle Registration Office in charge of the following testing.
b. Technical report to be submitted to the Local Vehicle Registration Office (this document must clearly and exhaustively illustrate all the changes made to the vehicle).

c. Accurate vehicle type indication. This information must be taken from the vehicle registration document if the converted vehicle was previously registered (in this case, submit a copy of the vehicle registration document) or declaration of conformity or certificate of origin if the vehicle was converted prior to registration.

D.G.M.: Refer to the D.G.M. datasheets at http://www.fiatprofessional-converters.com.

Integrative documents needed by Fiat Chrysler Automobiles for evaluating conversion for authorisation purposes

d. Detailed drawings stamped by an authorised professional engineer of:
- connection system between additional superstructure and basic vehicle;
- any changes to the basic vehicle body (opening of windows, doors, cuts etc.);
- any changes to mechanical parts and/or electric system;
- any wiring diagram of conversion and interfacing with basic vehicle;
- additional structures integrating basic vehicle structure (mandatory for interventions on “chassis cab with load platform”).

e. Calculation of weights respecting basic vehicle type-approval values with determination of gross vehicle weights and capacities in the various conditions of use.

f. Type of mission for which the vehicle is intended (prevalent/exceptional loads, routes, environment conditions etc.).

g. Document releasing Fiat Chrysler Automobiles of liability with regards to faults or failures occurring on the vehicle and related in any manner to its conversion.

GUIDELINES FOR GOOD OPERATION AND ACCESSIBILITY OF VEHICLE COMPONENTS

Special care must be adopted during conversions to prevent altering performance and functional features of original parts in any manner.
Specifically:

- Ensure accessibility to all points which need to be inspected and serviced.

- Do not alter the possibility of disassembling mechanical assemblies.

- Maintain the original engine cooling and intake conditions (radiator, air ducts, cooling lines).

- Maintain adequate brake ventilation.

- Ensure free rear wheel shaking and position the wheel arches appropriately.

- Ensure correct headlight adjustment.

TECHNICAL APPROVAL FOR MULTISTAGE CONTRACT (2007/46/EC)

The Manufacturer reserves the right to ask the upfitter
to carry out the tests and trials deemed necessary with a view to obtaining
Technical Approval.

TECHNICAL APPROVAL DOCUMENTATION

List of documents required for Technical Approval:
The number of copies to be sent to Fiat Chrysler Automobiles
(two copies if in print form, one copy if digital).

a) Detailed technical report (this document must clearly and exhaustively illustrate all the changes made to the vehicle).
b) Sketch of the converted vehicle with indication of main dimensions (height, length, width, wheelbase, overhangs, unladen vehicle ground clearance). The converted vehicle drawing must include four views on one sheet, normally on 1:20 scale (without indications of structures or calculations checks)
d. Detailed drawings, stamped by a professional engineer, of:
- connection system between additional superstructure and base vehicle;
- any changes to the base vehicle body (opening of windows, doors, cuts etc.);
- any changes to mechanical parts and/or electric system;
- any wiring diagram of conversion and interfacing with base vehicle;
- additional structures integrating base vehicle structure (mandatory for interventions on “chassis cab with load platform”).

d) List of parts removed and modified of the original vehicle
e) List of additional parts
f) Calculation of weights respecting basic vehicle type-approval values with determination of gross vehicle weights and capacities in the various conditions of use.
g) The vehicle’s mission profile (prevalent/exceptional loads, routes, environment conditions etc.).
h) Accurate vehicle type indication. This information must be taken from the vehicle registration document if the converted vehicle was previously registered (in this case, submit a copy of the vehicle registration document) or declaration of conformity or certificate of origin if the vehicle was converted prior to registration.
i) Copy of reports of any tests carried out at recognised technical centres
j) Copy of reports of any structural calculations carried out on the conversion or on its components
k) Description of the production process leading to vehicle conversion.
l) Document releasing Fiat Chrysler Automobiles from liability with regards to faults or failures occurring on the vehicle and related in any manner to its conversion.

D.G.M.: Refer to the D.G.M. datasheets at

http://www.fiatprofessional-converters.com

CONTENTS

Overview 1.6
Bodywork and chassis 2.1
Electrical system 3.1
Main dimensions 4.1

OVERVIEW

Purpose of coach builders instructions 1.7
FIAT CHRYSLER AUTOMOBILES S.p.A. approval of conversions and fitting-out 1.7
Liability 1.7
Warranty 1.8
Application for approval 1.8
Markings and logos 1.8
Legal requirements 1.9
Seat belt anchor points 1.9
Seats 1.9
Interior shelves 1.9
Operations on vehicle structure and floor 1.9
Ambulances 1.10
Accident prevention 1.10
Choice of materials: Environment – Recycling 1.10
Vehicle hand-over 1.11
Vehicle management in compounds 1.12
Presentation of the range 1.14

Purpose of coach builder's instructions

This document provides instructions about how to make modifications and/or fit-out original FIAT CHRYSLER AUTOMOBILES S.p.A. vehicles while maintaining the correct function, safety and reliability of the vehicle itself and its component parts.

FIAT CHRYSLER AUTOMOBILES S.p.A. approval for conversions and fitting-out

Modifications must be made according to the criteria given below.

Liability

The approval given by FIAT CHRYSLER AUTOMOBILES S.p.A. only concerns the technical/ conceptual feasibility of the modification and/or fitting-out to apply to an original FIAT vehicle.
The coach-builder is therefore liable for:

- The design of the modification and/or fitting;
- The choice of specifications of the products/materials used;
- The execution of the modification or fitting-out;
- Compliance of the design and realisation with all instructions provided by FIAT CHRYSLER AUTOMOBILES S.p.A.;
- Compliance of the design and realisation with all standards in force in the country in which the vehicle is registered;
- The function, safety and reliability and, in general, efficient performance of the vehicle, as well as the effects that the modification or fitting-out may have on the performance and characteristics of the vehicle.

Warranty

The coach-builder responsible for building the superstructure or making modifications to the chassis must guarantee that the works have been carried out in a workmanlike manner and in full compliance with the instructions given in this publication. The warranty given by FIAT CHRYSLER AUTOMOBILES S.p.A. on the vehicle shall be forfeit if:
- The instructions given are not followed, or the conversion/fitting-out is not authorised;
- The conversion is carried out on a chassis not suitable for the foreseen use;
- The specifications and instructions that FIAT CHRYSLER AUTOMOBILES S.p.A. makes available for the correct execution of certain kinds of conversion are not followed;
- The original parts and components that FIAT CHRYSLER AUTOMOBILES S.p.A. manufactures for certain types of conversions are not used.

Application for approval

Applications for approval or assistance in the realisation of conversion works must be sent to the pertinent FIAT CHRYSLER AUTOMOBILES S.p.A. market agents.
To obtain approval the coach-builder must provide sufficient documentation illustrating the foreseen conversion, type of use and use conditions for the vehicle. All drawings must clearly show any differences to the instructions provided.
The coach-builder shall be responsible for obtaining approval by the competent Authorities of the conversion and/or fitting-out.

Markings and logos

Factory markings, logos and names must not be altered or moved in relation to their original positions; the validity of the vehicle's image must also be upheld.

The application of conversion or fitting/out trademarks or logos must be authorised by FIAT CHRYSLER AUTOMOBILES S.p.A. These must be placed in the immediate vicinity of the existing FIAT CHRYSLER AUTOMOBILES S.p.A. trademarks and logos.

FIAT CHRYSLER AUTOMOBILES S.p.A. reserves the right to remove its trademark or logo if the fitting-out or conversion has any features not in compliance with its requirements; in such cases the coach-builder shall be totally liable for the entire vehicle.

Legal requirements

With the vehicle completed, the coach-builder must verify that all works done (modifications, structural applications.) comply with all legal requirements of the country in which the vehicle is registered (i.e. weight, dimensions, braking capacity, emissions, noise levels).

The vehicles described in this manual comply with EU Directives. This compliance must be maintained even after conversion and/or fitting-out. Possible exceptions to this requirement may include cases in which it is possible to obtain local approval, different to that of the EU.

Seat belt anchor points

Works undertaken on zones in the vicinity of seat belt anchor points may alter their compliance with EU certification and therefore the coachbuilder must always check compliance with legal standards.

Seats

The seat floor anchors are realised in compliance with legal standards on retainer systems.

If they are moved from the original position, passenger safety may not be assured, nor the quality of the conversion works. It is therefore forbidden.

Altering the configuration of the cabin seats (number of places) is also forbidden.

Interior shelving

These structures must be designed and realised to be self-supporting and sufficiently rigid.
The internal fastening must be to the floor supporting structure (cross and side members) and mealised such as to distribute the load evenly.
Anchors to side structures, realised without creating any pre-stress, may be fastened to:
- the boxed pillar structure, where specific holes and anchor points are already provided (see paragraph – LOADS ON SIDES)
- the upper side connector members.

Operations on vehicle structure and floor

Following the instructions and precaustions already described in the previous paragraph. In particular, note that:
- when perforating non-structural box sections, avoid zones where stress is more concentrated
- holes for floor anchors must be protected and sealed against water, gas and dust infiltration.

Ambulances

We advise special attention in:
- connection of the side panelling and under-roof, using the anchor zones and holes already present on the body shell, both on cross and side members, avoiding any cutting that may weaken the structure.
- checking to verify that the application and use of medical equipment does not interfere with the basic vehicle electrical/electronic systems.

Accident prevention

The structures and systems applied to the vehicles must comply with all accident prevention and safety standards in force in the individual countries to which the vehicles are destined.

All precautions dictated by technical knowledge and common sense must also be taken to prevent breakdowns or functional defects.
The manufacturer of the applied structure or system is obliged to comply with these requirements.

Choice of materials: Environment - Recycling

During the design phase, an increasing amount of attention must be paid to the choice of materials to use, in particular as regards aspects associated with the environment and recycling, and especially in the light of continually changing national and international standards governing waste disposal.
Here are a few guidelines:
- It is forbidden to use materials that are harmful to human health, or that may present a potential hazard, such as those containing asbestos, lead, halogen additives, fluorocarbons, cadmium, mercury, hexavalent chromium, etc.
- Always use materials that produce a minimal amount of waste when processed, and that permit easy recycling after first use.
- With composite type synthetic materials, use components that are compatible with each other, envisaging their possible use even combined with other recovered or recycled materials. Always apply markings in compliance with standards in force.

Vehicle hand-over

Before handing-over the vehicle, the coach builder must:
- Make certain that the conversion and/or fitting-out has been correctly realised;
- Fully tune the vehicle and/or fitting-out applied;
- Check vehicle and/or fitting-out function and safety;
- Prepare and hand-over to the end user all the necessary instructions for operating and maintaining the vehicle version and any additional systems fitted;
- Include all new data on specific information plates on the vehicle;
- Provide confirmation that the works carried out comply with the instructions given by the vehicle Manufacturer and all legal requirements;
- Issue a warranty for the modifications made to the vehicle.

The vehicle leaves the factory with “Logistic Mode” (LM) function on.
By deactivating some electric loads, such as radio, roof lights, main beam headlights, etc., this function preserves the battery charge while the vehicle is on stock.
The battery warning light blinks on the instrument panel when the LM function is on.
The correct instrument (EXAMINER or RD 380) is needed for deactivating the function if the outfitter finds loads deactivated by the LM function during conversion.
The LM function must be activated again after vehicle conversion.
WYTECH Plus: the diagnosis equipment used in all FGA authorised workshops for running diagnosis on vehicles and for deactivating the Logistic Mode function.

Supplier:
ACTIA ITALIA S.r.l. (After-Sales Division)
Via Europa, 31-20010 PREGNANA MILANESE (MI)
Fax: +39 02 93 59 50 40
Web site: www.actiaitalia.com – www.wytechplus.com
Email: actiasupport@actiaitalia.com

RD380: Instrument which rapidly allows the activation and deactivation of Logistic Mode. It has no other functions.

Supplier:
SIX TAU S.p.A.
Via Guglielmo Marconi, 810040 DRUENTO (TO)
Ph. +39 011 994 08 24
Fax +39 011 994 04 08
Web site: www.sixtau.com
Email: info@sixtau.com

Vehicle management in compounds

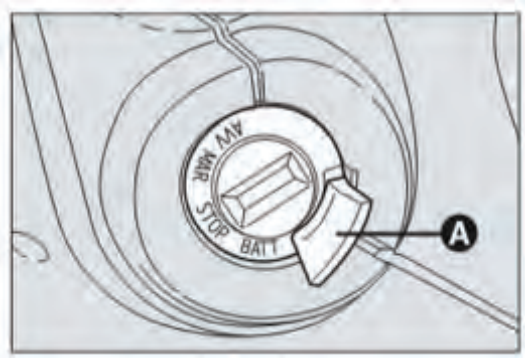
Subject of the document
This procedure is a set of mandatory regulations for vehicles on compounds aimed at preserving the original quality of the product and avoiding malfunctions for the end customers.

Area of application
This procedure described applies to all vehicles parked at compounds.

Procedure
Parking position

- **Battery**: disconnect the battery by disconnecting the negative battery pole.

  If the vehicle is provided with a battery master switch, turn the ignition switch to the



- **Windscreen wipers:** lift the blades from the glass.
- **Handbrake:** leave gear in idle position and engage first gear

  (in case of Comfort-Matic robotised gearbox, set lever in position N).

Maintenance
- **Battery**: check battery charge state one month after the production of the vehicle and then once every three months (it is advisable to carry out the measurements two hours after having connected it).
  - Change the battery if the voltage is lower than 12.1 V.
  - Recharge the battery if the voltage is from 12.1 V to 12.49 V.
  - The battery is charged if voltage is higher than 12.5 V.

  It is important to keep track of checks and measurements on a specific form.
- **Tyres**: check inflation pressure of tyres one month after the production of the vehicle and then once every three months. Pressure must be measured when cold and correspond to the values shown in the Owner Handbook.
  Restore the correct pressure, if required.

Commissioning
- **Battery**: before dispatching the vehicle, reconnect the negative battery pole by correctly connecting the terminal. If an optional “battery master switch” is fitted, simply turn

the key to the “MAR” position.

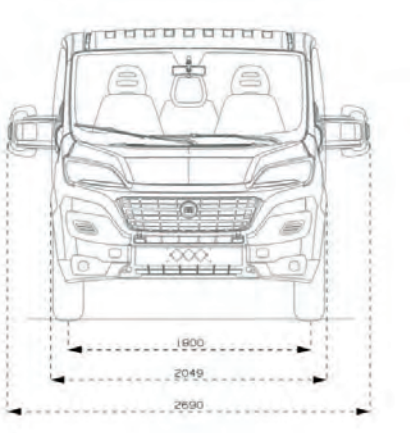
- **Tyres**: re-establish correct pressure.
- **Fuel:** for storage over three months, pour antibacterial protection in the tank (e.g. Petronas “Tutela Professional Diesel TMF PLUS”).

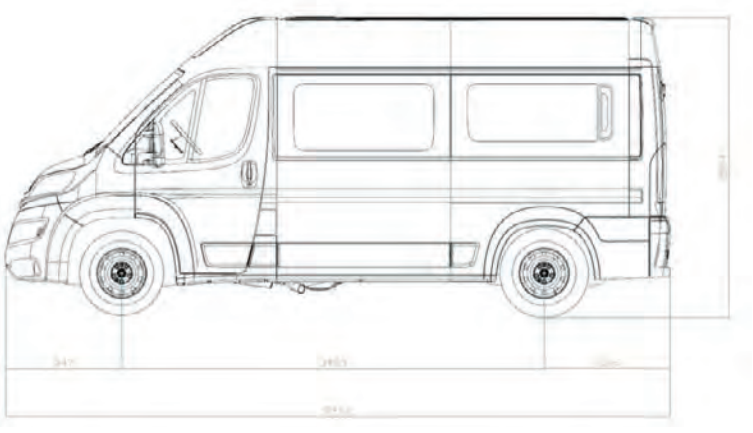
Presentation of the range

The range of vehicles suitable for conversion includes the following versions:
- Van;
- Van with windows;
- Chassis cab;
- Special chassis cab;
- Chassis cab with platform;
- Basic chassis;
- Special basic chassis;
- Double cab;

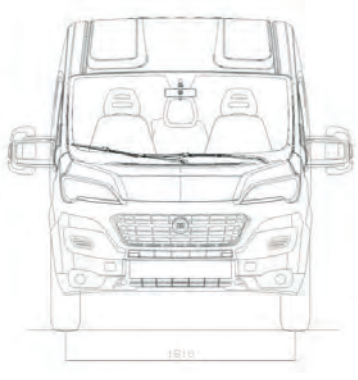
The drawings listed are for information only. For all the wheelbases and main dimensions, refer to the chapter ‘Dimensions’ from page 4.1.

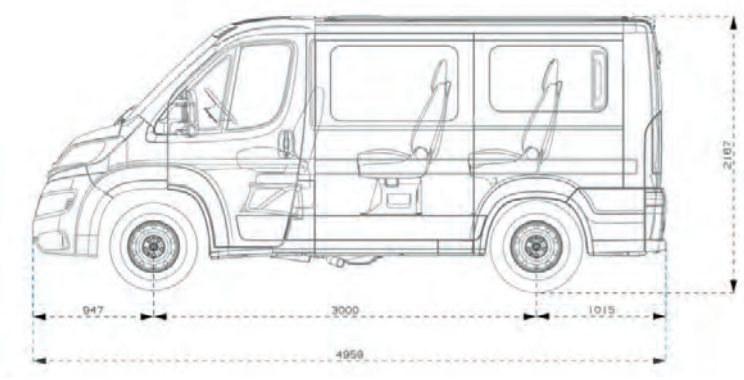
VAN



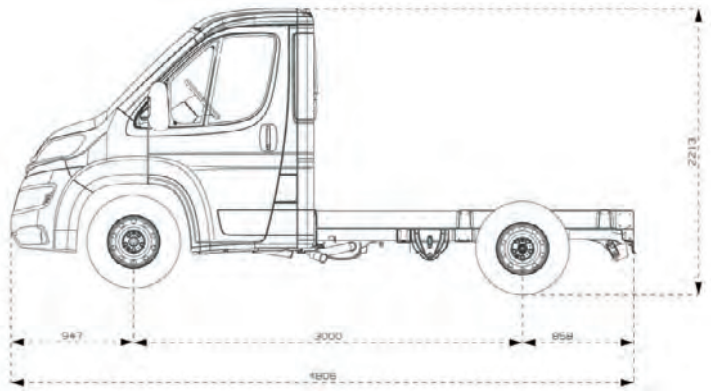


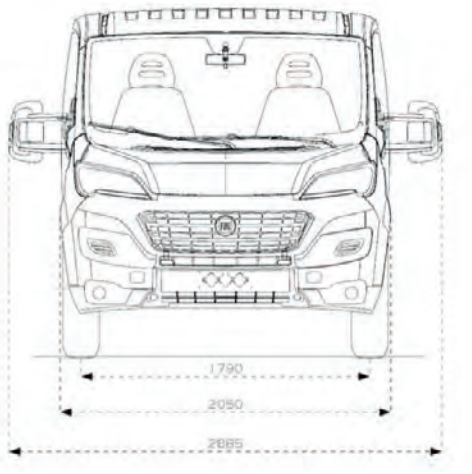
VAN WITH WINDOWS



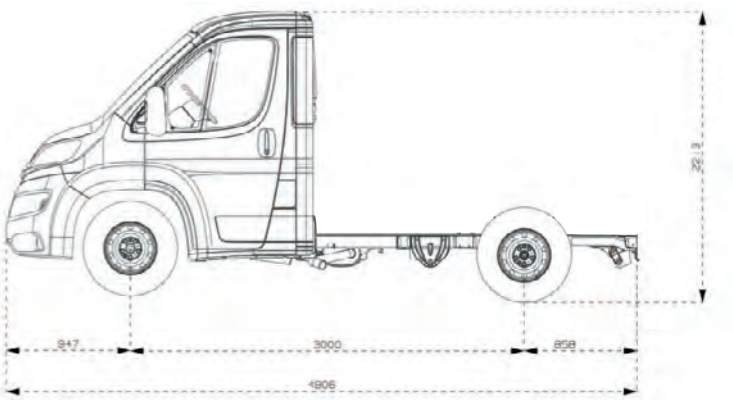


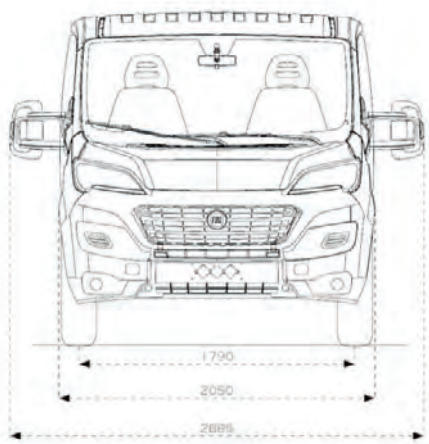
CHASSIS CAB



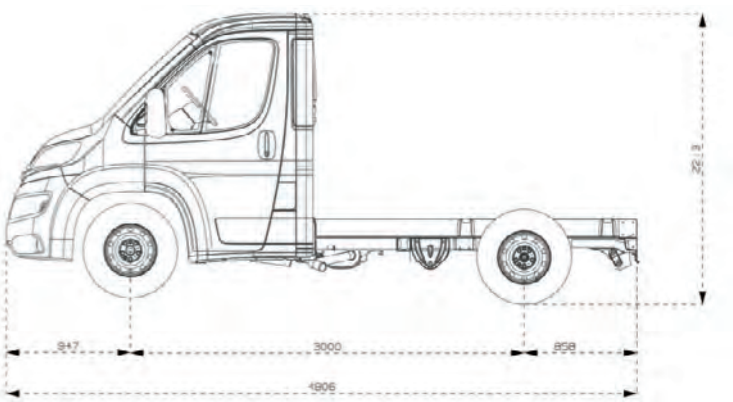


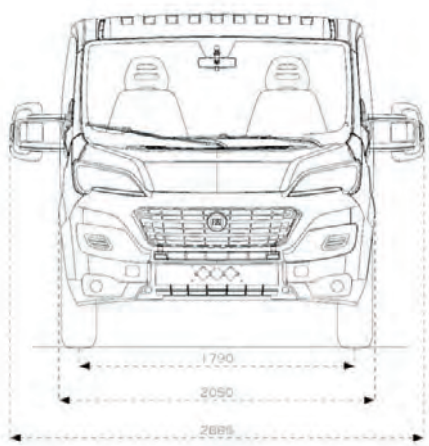
SPECIAL CHASSIS CAB



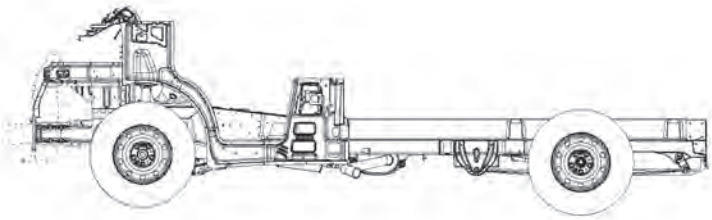


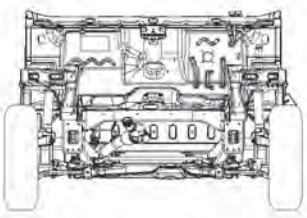
CHASSIS CAB WITH PLATFORM



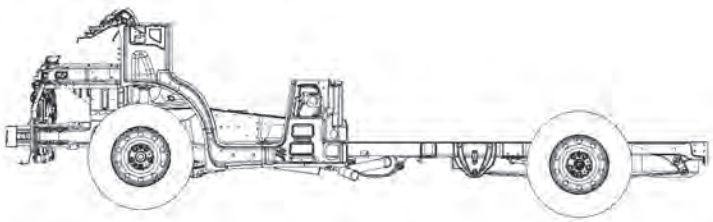


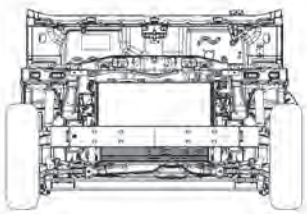
BASIC CHASSIS



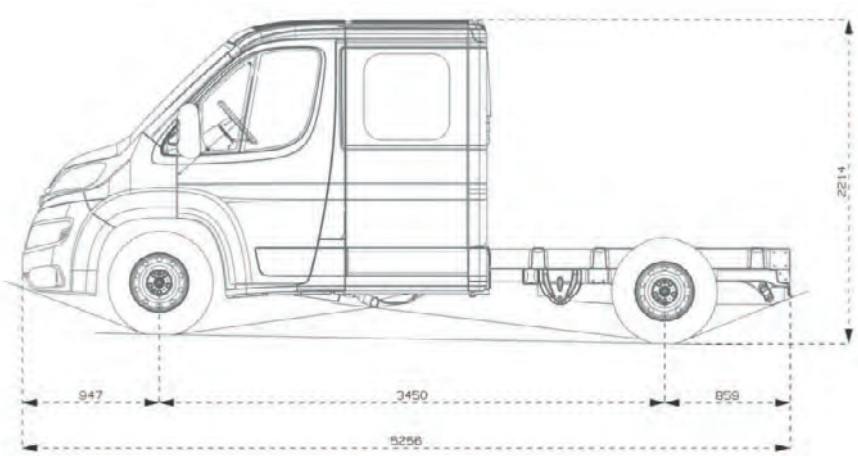


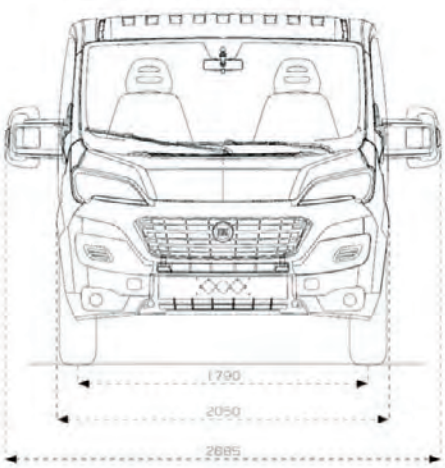
SPECIAL BASIC CHASSIS





DOUBLE CAB





BODYWORK AND CHASSIS

Maximum permitted weights 2.2
Towing capacity 2.4
Centre of gravity 2.5
Profile limits 2.6
Modifying rear overhang 2.7
Chassis cab lengthening limits 2.8
Overhang lengthening methods 2.10
Tow hook 2.12
Attachment pre-fittings 2.13
Finishing elements 2.14
Indications for modifying front 2.15
Modifications to the roof 2.16
Wheel arch dimensions 2.18
Wheels and suspension 2.19
Cab habitability diagram (van version) 2.20
Spare wheel 2.21
Relocation of spare wheel for chassis cab and basic chassis versions 2.22
Indications for connecting superstructures 2.23
Fitting the counterframe 2.24
Plan and reference holes for superstructure application (Camping Car) 2.25
Side load retention 2.33
Instructions for eliminating 'Crash box' cross members 2.37
Fuel supply system 2.38
Piping technical specifications 2.39
Fitting a roof rack 2.40
Sections of roof rack attachment points 2.41
Positioning attachments 2.44
Opening of a hatch in the roof 2.45
Making a window in the side 2.46
Installing heater 2.47
Fittings for supplementary heater / air-conditioner 2.48
Air suspension 2.50
Changes to the wheelbase 2.53
ESC system 2.54

Maximum permitted weights

Overall vehicle weights and the maximum admissible weights per axle are given in the table below. The tare weights refer to STDA configuration (unladen weight with 90% of fuel);
Special equipment may cause variations to weight and weight distribution over the axles.
Before carrying out the conversion, check vehicle unladen weight and weight distribution per axle.
To ensure constant and correct set-up and peak capacity, even on low grip road surfaces, safe dynamic behaviour reliability and the required performance, weight distribution must be within the following limits (that must not be exceeded) in all load conditions:

- **Front axle: weight at ground always between 70% and 40% of the total vehicle ground weight**
- **Rear axle: weight at ground always between 30% and 60% of the total vehicle ground weight.**

According to the weight distribution, the total ground weight and/or maximum admissible weights on the axes may not be fully saturated.

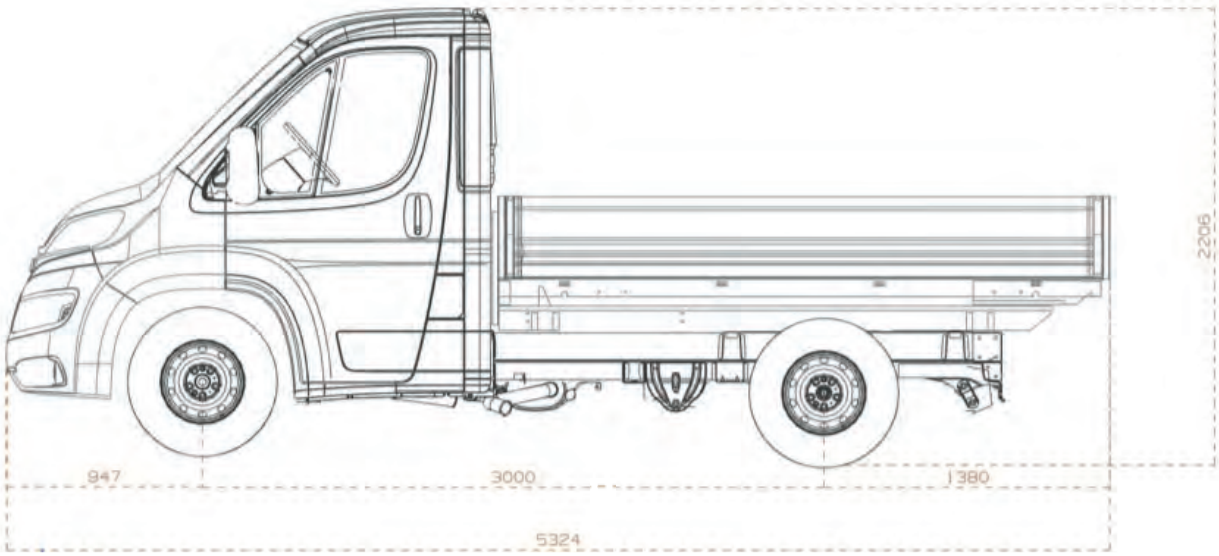
Vehicle diagram identification data table

Ducato					
version	GVW Kg	Max. front axle Kg	Max. rear axle Kg	Payload q	wheels
12 Q	3000	1630	1650	11-12	R" 15
15 Q	3300	1750	1900	13-15	R" 15
17 Q	3500	1850	2000	15-17	R" 16
Ducato Maxi					
17 Q	3500	2100	2400	14-16	R" 16
20 Q	4000	2100	2400	18-20	R" 16
22 Q	4250	2100	2400	18-22	R" 16

Camping-car chassis-cabs and chassis-cowls

Ducato					
version	GVW Kg	Max. front axle Kg	Max. rear axle Kg	Payload q	wheels
30 Q	3000	1630	1650	-	R"15
33 Q	3300	1750	1900	-	R"15
36,5 Q	3650	1850	2000	-	R"15/16
Ducato Maxi					
42,5 Q	4250	2100	2400	-	R"16
44 Q (180HP)	4400	2100	2500*	-	R"16

* standard on 150-180 HP



W: GVW;
W1: Max. Load on front axle;
W2: Max. Load on rear axle;
R: Wheels.

Towing capacity

The limits given in FIAT CHRYSLER AUTOMOBILES S.p.A. documents must be respected. Special attention must be paid to vehicles with load concentrated on the rear overhang and short wheelbase vehicles with high centre of gravity.
The positioning of auxiliary equipment and superstructures must ensure even transverse load distribution. For each wheel, a variation in the nominal load on the wheel (1/2 the load on the axle) of ±4% with respect to the permitted tyre loading is possible without jeopardising braking capacity and vehicle driving stability.

Version	GVW (Kg)	Towing weight (Kg)
30	3000	2000
33	3300	2000
35	3500	2000
36,5	3650	1850
Maxi 35	3500	2500
Maxi 40	4000	2500
Maxi 42,5	4250	2250
Maxi 44	4400	2100

The rear overhang of the superstructure must be realised considering the maximum permitted axle loading, the minimum load required on the front axle, length limits, the position of the two hook and the underrun protection bar foreseen by various standards.

Special exceptions to the maximum permitted weights may be given for special uses, for which precise use limits will be nevertheless established, along with any reinforcing to apply to vehicle organs.

These exceptions, if they exceed legal limits, must be authorised by the administrative Authorities.

NOTE: With the vehicle ready for the road (conversion completed) the difference in weight between the right side and left side must not exceed 100 kg, to prevent prob-lems with vehicle geometry.

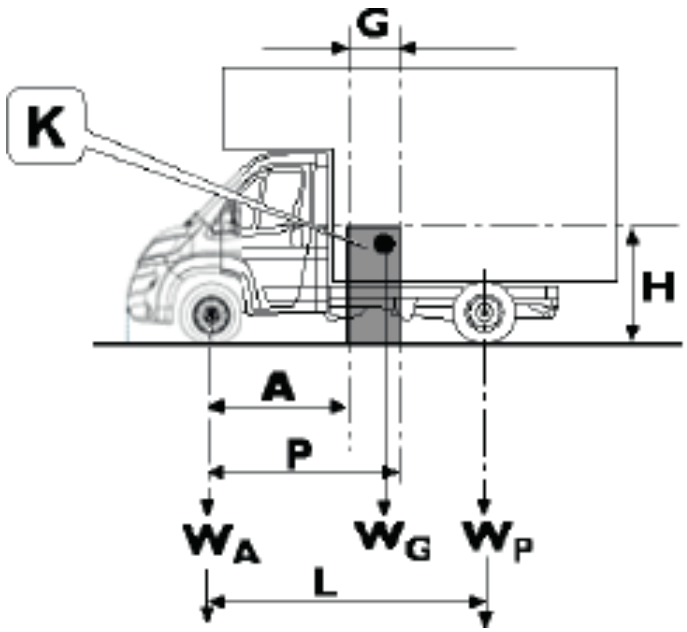
Centre of gravity

The height from ground of the non-converted chassis cab vehicle centre of gravity is given in the specific technical documentation for each model/version.

To test the vehicle complete with superstructure, the coach-builder must check that the height of the equipment centre of gravity (including the payload) or the entire vehicle under full load respects the maximum permitted values.

These limits are defined in compliance with national and international standards (e.g. EU Directives on braking), or are required by FIAT CHRYSLER AUTOMOBILES S.p.A. to assure good vehicle dynamic behaviour (e.g. transverse stability in motion).

Full functionality of ESC system is assured when those limits are respected.

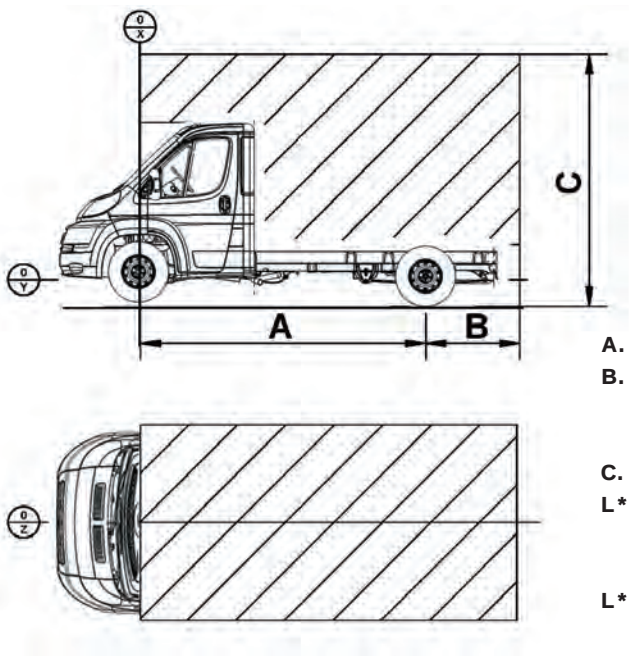


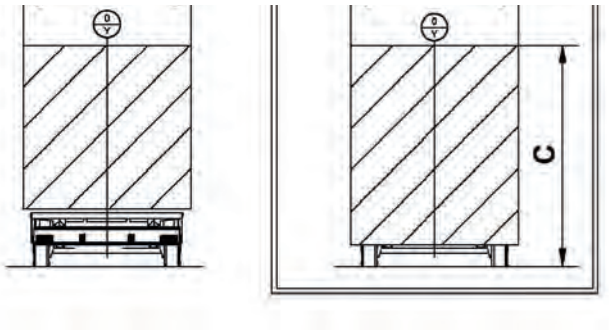
K	=	Centre of gravity G position in all converted vehicle load conditions
L	=	Vehicle wheelbase
Cm	=	Gauge (maximum between fr. and rear)
WG	=	Total maximum ground weight
WA	=	Front axle max admissible weight
WP	=	Rear axle max admissible weight
A	=	WG - WA)*L/WG (minimum distance from front axle)
P	=	L* WP/ WG (maximum distance from front axle)
G	=	P – A (G longitudinal range)
H	=	0,7*Cm (G vertical range)

In version where the payload can shift sideways (e.g. suspended loads, transport of fluids, etc.), higher dynamic loads may be generated when turning, resulting in reduced vehicle stability. This must be considered in the vehicle operating instructions, or for any reductions to centre of gravity height.

Particular attention must be given to ensuring compliance with the weight limits established for the individual axles and the overall weight limit, also considering the foreseen number of passengers and a sufficient margin for the loads that may be transported with them, such as:
- luggage, tents, sports equipment;
- water tank capacity, toilets;
- gas bottles, etc.

PROFILE LIMITS (chassis cabs)





A. Wheelbase

B. Overhang = 60% of wheelbase
(65% of wheel base for motorhome)
with coach-builder responsible for approvals (•)

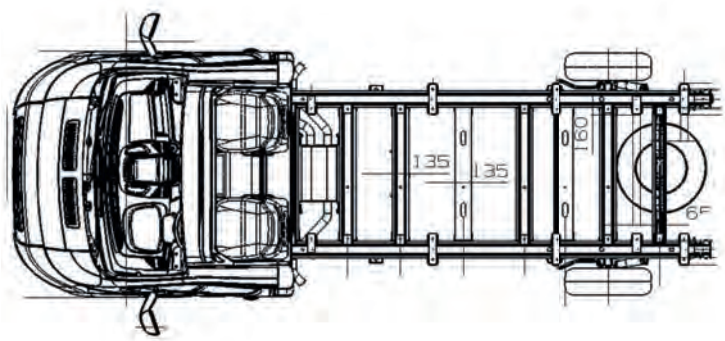
C. Height = 3500 mm (with unladen vehicle)

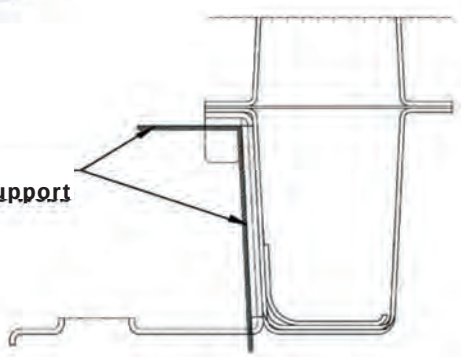
L* 2050 mm with standard mirrors
2200 mm with long arm mirrors
2350 mm with extra-long arm mirrors

L** 2430 mm – conversion from basic chassis vehicle into motorhome

(•) For all wheelbases longer than 3800 mm, the maximum permitted overhang must not exceed 2400 mm.

Elimination of mounting for Webb hook





NOTE The mounting must be cut as shown. Restore anti-rust treatment after cutting.

Modifying rear overhang

Modifying the rear overhang causes a significant change in the distribution of ground loads on the axles. Lengthening works must take this into account, checking that the values of the maximum loads permitted for each axle are nevertheless observed.

The operation to modify the overhang must be carried out in accordance with the requirements given on the following pages.

In addition, the possible lengthening operations may be deduced from the diagrams (see following page), where the shaded area defines all the possible dimensions of the overhang in relation to the vehicle's wheelbase.

Lengthening the overhang may involve repositioning the underrun protection bar in compliance with regulations in force.

The modification must be made without making welds on chassis box sections, as this procedure would involve destroying the internal treatment obtained by cataphoresis; in addition, the vehicle is already equipped with holes for fastening overhang extension structures (see following pages).

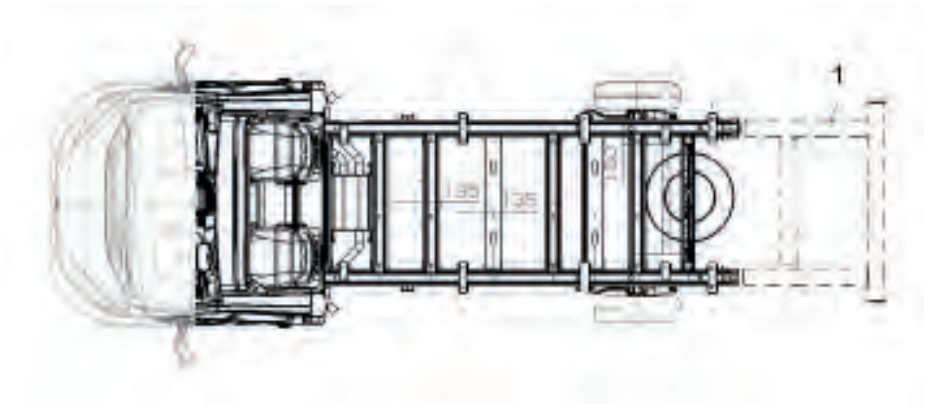
NOTE: Do not make cuts in areas where stresses are highly concentrated.

In addition the cutting lines must not affect existing holes on the longitudinal members.

For materials of the added structures, refer to the specifications of the original longitudinal members.

For overhang lengthening instructions, see the following pages.

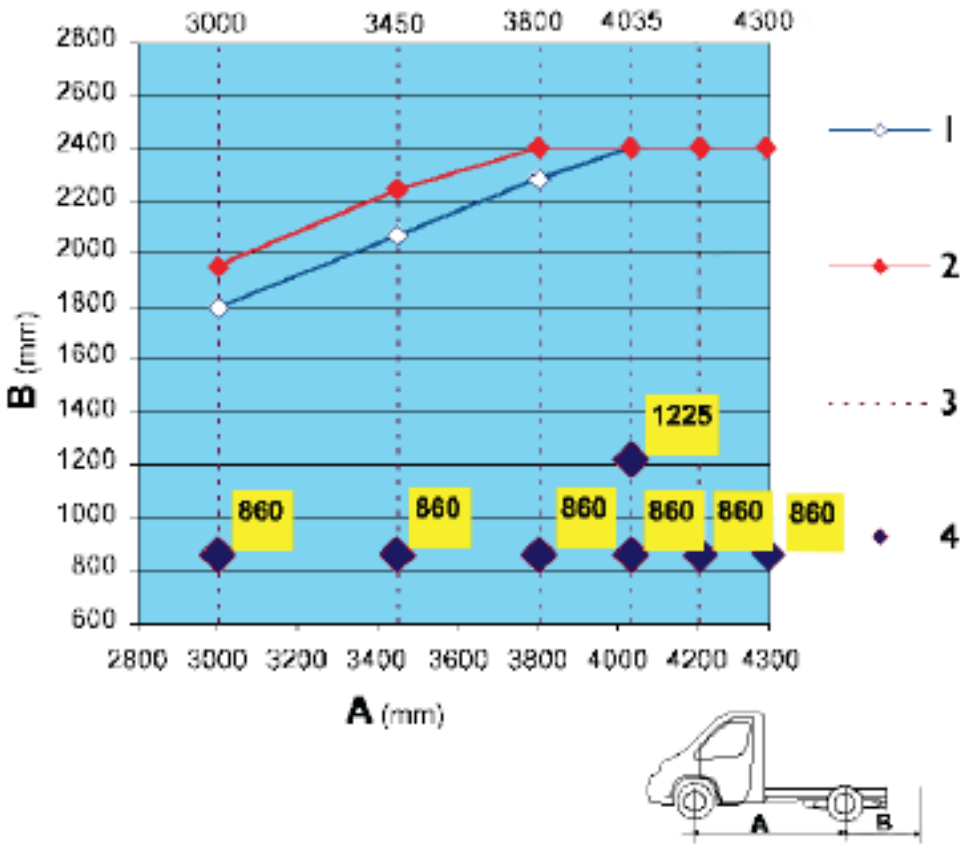
Per le indicazioni di allungamento dello sbalzo, vedere le pagine seguenti.



1: indicative outline of structure for lengthening overhang.

Chassis cab lengthening limits.

The permitted extensions to the overhang can be deduced from the diagram below.



1. Maximum overhang length according to wheelbase (60% for all versions excluding Camping-car).
2. Maximum overhang limit according to wheelbase (65% for Camping-car versions).
3. Original wheelbase.
4. Original overhangs (*).

For all wheelbases that exceed 3800 mm the maximum length of the projecting part must not exceed 2400 mm.

(*) - Chassis cabs, chassis cab with platform and standard basic chassis: 860 mm; (extra-long overhang: 1225 mm).

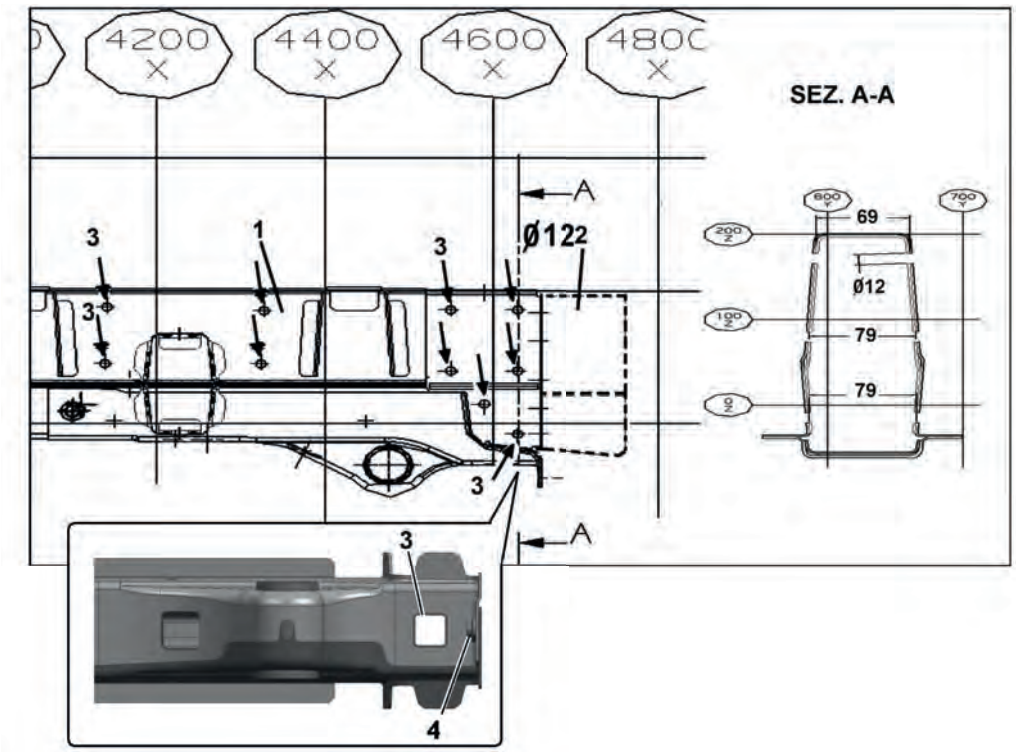
- Special cabs, chassis cab with platform and special basic chassis: 880 mm; (extra-long overhang: 1245 mm).

A: Wheelbase length.

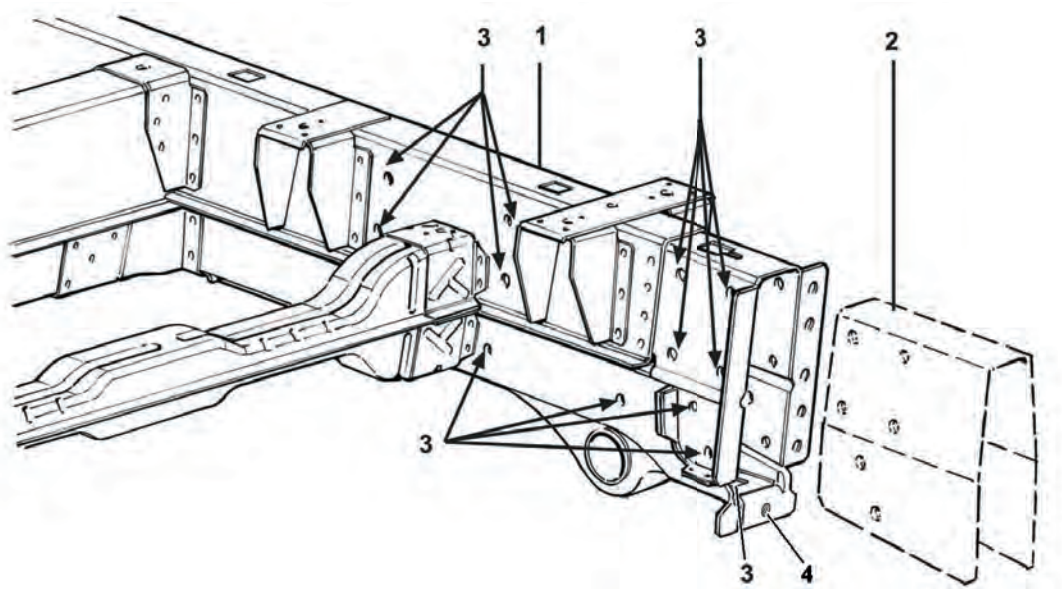
B: Overhang length.

Overhang lengthening methods
Normal chassis cab (with sub-frame)

Sections



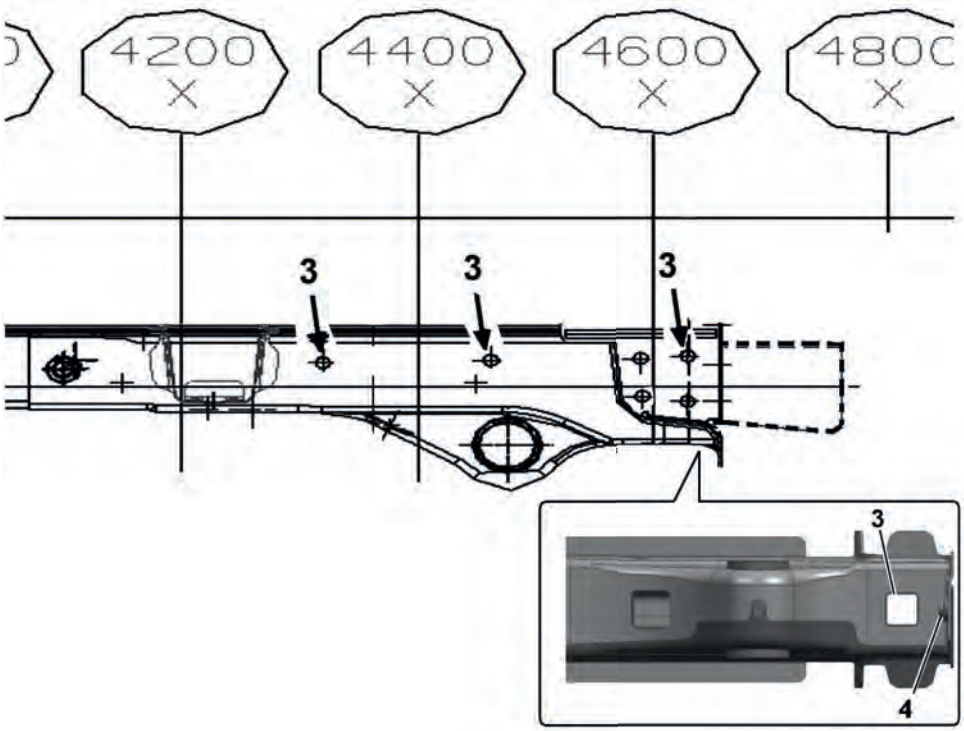
Perspective view



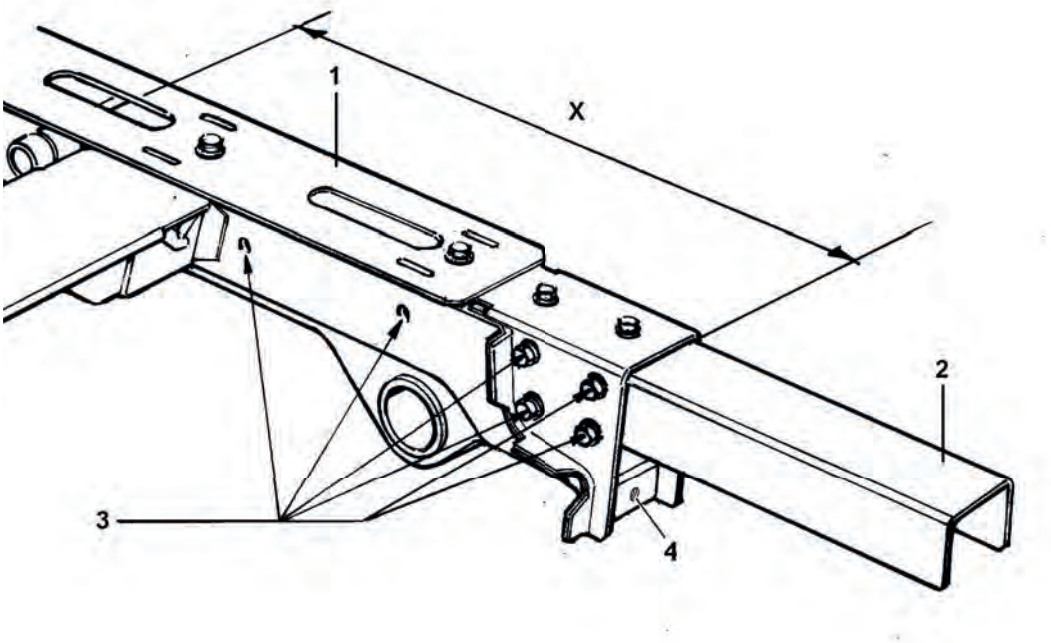
1: longitudinal member; 2: structure by coach-builder; 3: holes for fastening structure, 4: ring nut.

Special chassis cab (without sub-frame)

Sections



Perspective view



1: longitudinal member; 2: structure by coach-builder; 3: holes for fastening structure; 4: ring nut x: maximum length of reinforcing: 560 mm.

Towing hook

Overview

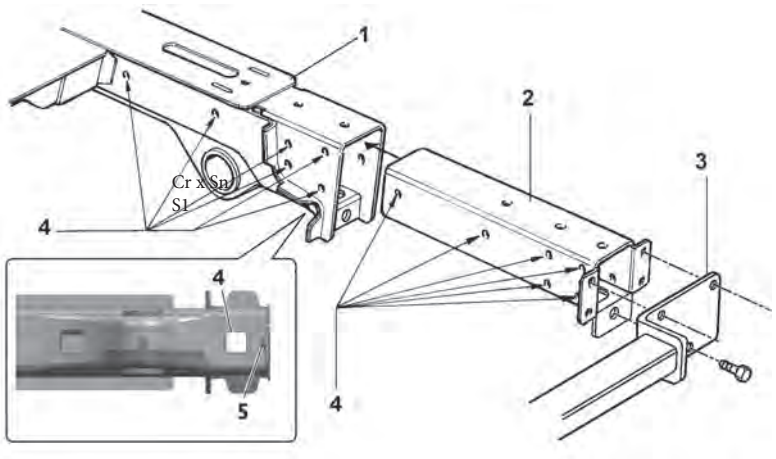
A towing hook can be applied without requesting authorisation to FIAT CHRYSLER AUTOMOBILES S.p.A. only on the specific cross-member provided and only on vehicles that FIAT CHRYSLER AUTOMOBILES S.p.A. has declared suitable for towing trailers.
Installation of towing hooks on vehicles for which towing is not originally foreseen must be authorised by FIAT CHRYSLER AUTOMOBILES S.p.A..

NOTE: Since tow bars are an important element for vehicle driving safety, all limitations imposed by standards in force must be respected, such as minimum space for braking and electrical system connections, minimum distance between axles, towing pin and rear edge of superstructure.

In the case the dimension of the hook attachment flange does not coincide with the existing holes on the vehicle transom bar, modifications can be authorised if suitable reinforcing is applied.

Attachment pre-fittings

The drawing shows the pre-fittings for applying the towing hook. The solution is valid for all Camping car.



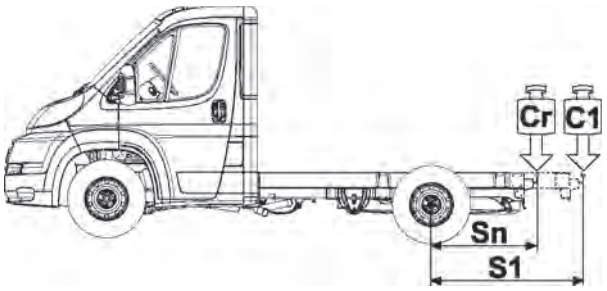
1: structure of the vehicle on which the towing hook transom bar is fastened; 2: tow hook stringer; 3: towing hook attachment flange; 4: holes for fastening assembly to chassis; 5: nut.

Calculation of maximum towable weight after vehicle conversion.

If overhang is lengthened, or the towing hook position changed with respect to the approved position, the towable weight can be calculated by means of the following formula:

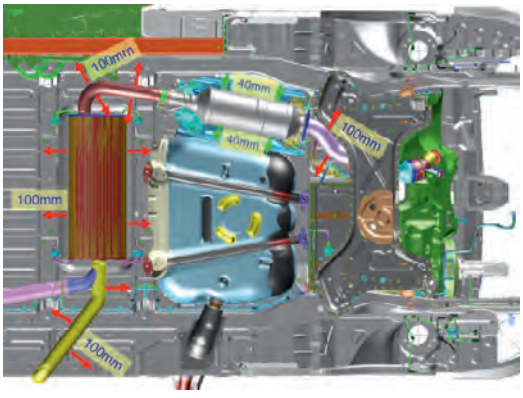
$$C_1 = \frac{Cr \times Sn}{S_1}$$

Where: S1 = Overhang with moved hook
C1 = New towable weight
Sn = Overhang with standard hook
Cr = Standard towable weight



Minimum distance from exhaust

As a result of the high temperatures reached by the exhaust pipe during the regeneration of the particulate filter (DPF), the following minimum distances from the “hot” elements should be observed when developing the underbody layout:
- Clearance of 100 mm on the sides from the areas where there is no heat shield*
- Clearance of 40 mm, in all directions, from the areas where there is a heat guard.”



(*) Do NOT plan any component above the hot zone if there is no heat shield.

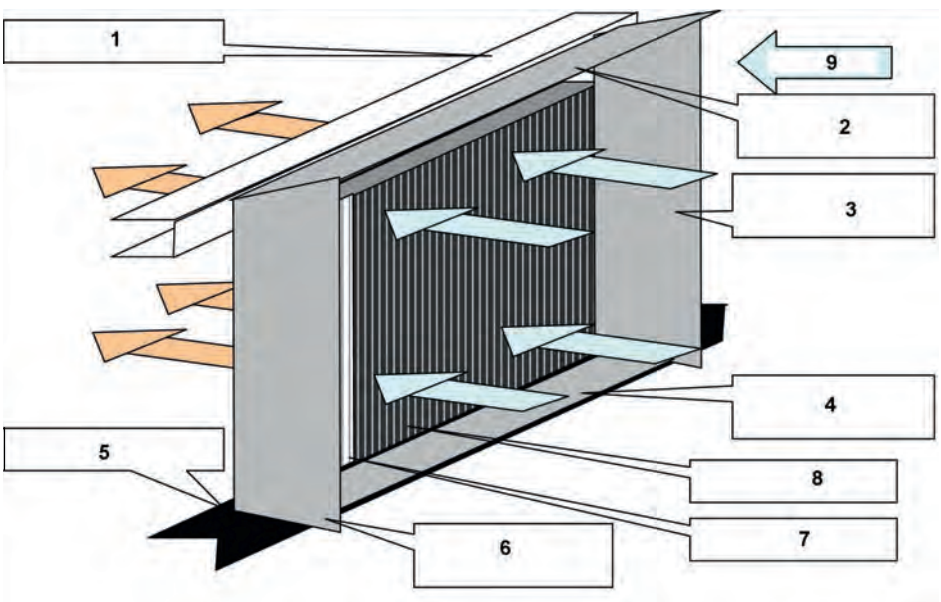
Finishing elements

If a different mat to the original is used on the floor of the driver's side, it must not interfere with the excursion of the pedals, limiting them (accelerator, brake, clutch).

Engine compartment

When making the conversion (motor-home), the front radiator grill must be designed to ensure at least the same passage of air as the original, as on the version with the same chassis cab.
Correct engine cooling must also be ensured, as on the original vehicle, making no changes to the inlet air permeability area, which must be no lower than that defined and visible on the version with similar cab.
When necessary, it is also recommended to implement an air flow conveyor, such as, for instance, the one in the attached diagram, in order to allow a regular flow toward the radiator.
No alterations or additional elements must be made to the areas of the engine that emit most heat (e.g. shields).

Dynamic flow WITHOUT conveyance on radiator – intercooler and air inlet cross member

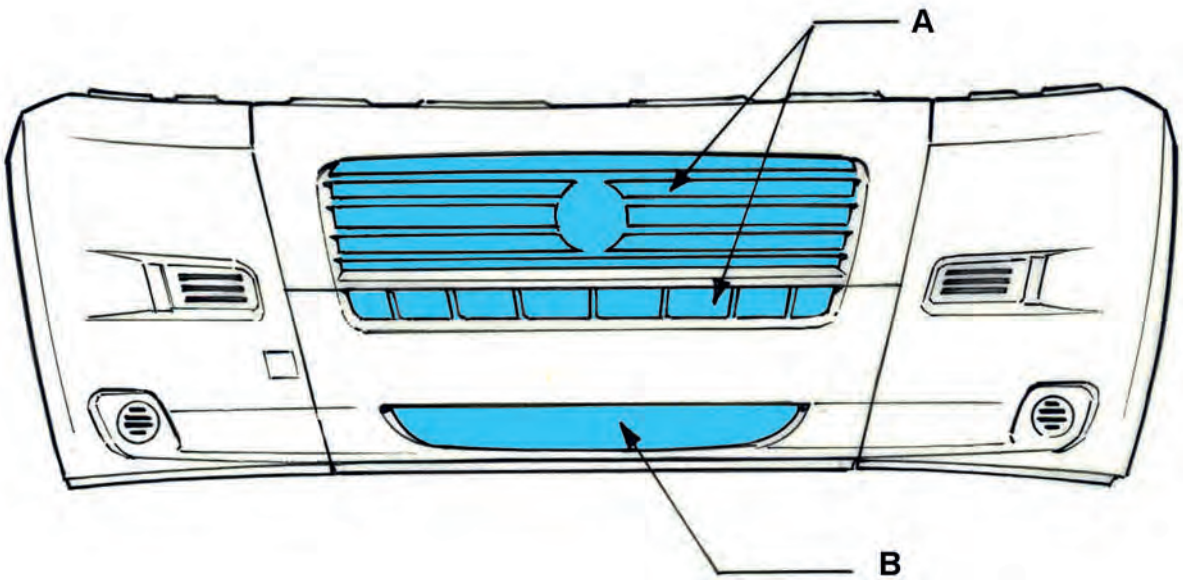


1: Upper cross member
2: Upper conveyance
3: LH lateral conveyance
4: Lower conveyance
5: Lower cross member
6: RH lateral conveyance
7: Intercooler
8: Engine radiator
9: Air flow

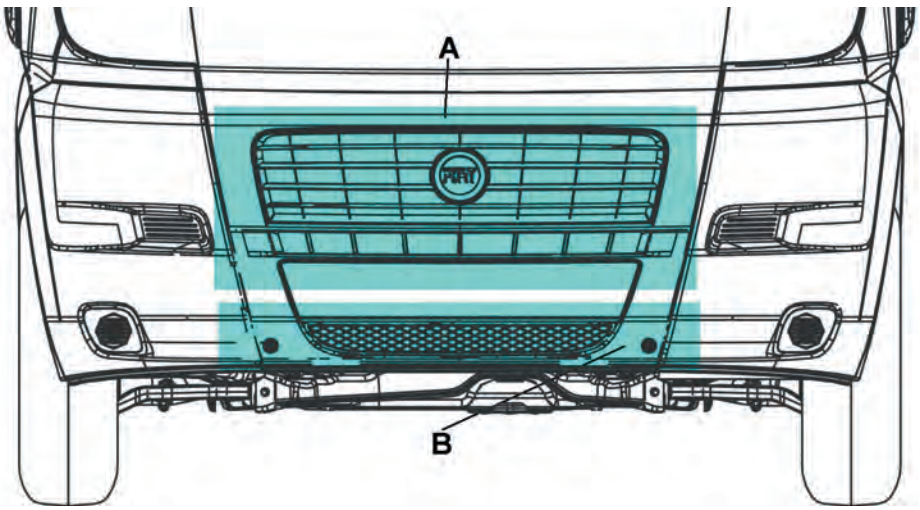
Indications for modifying front.

Technical specifications of intake air permeability surface in engine bay on basic vehicles.

A	14.8 dm^2	A: upper air intake
B	3.9 dm^2	B: lower air intake
C	18.7 dm^2	C: total area



If modifications to the vehicle front are required, the air permeability surface must be uniformly distributed, maintaining the values used on the original version, over the areas corresponding to the radiator (see diagram below).

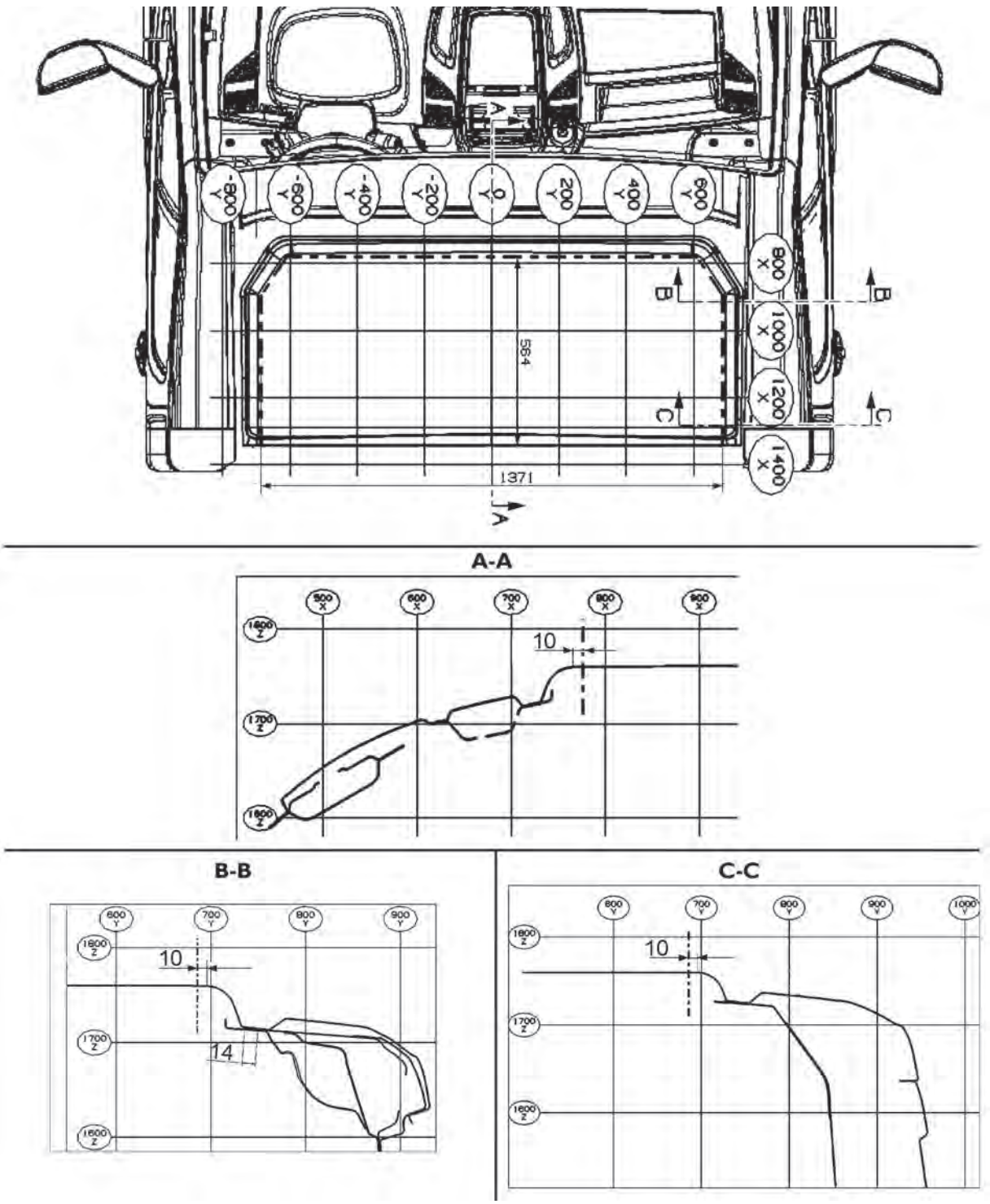


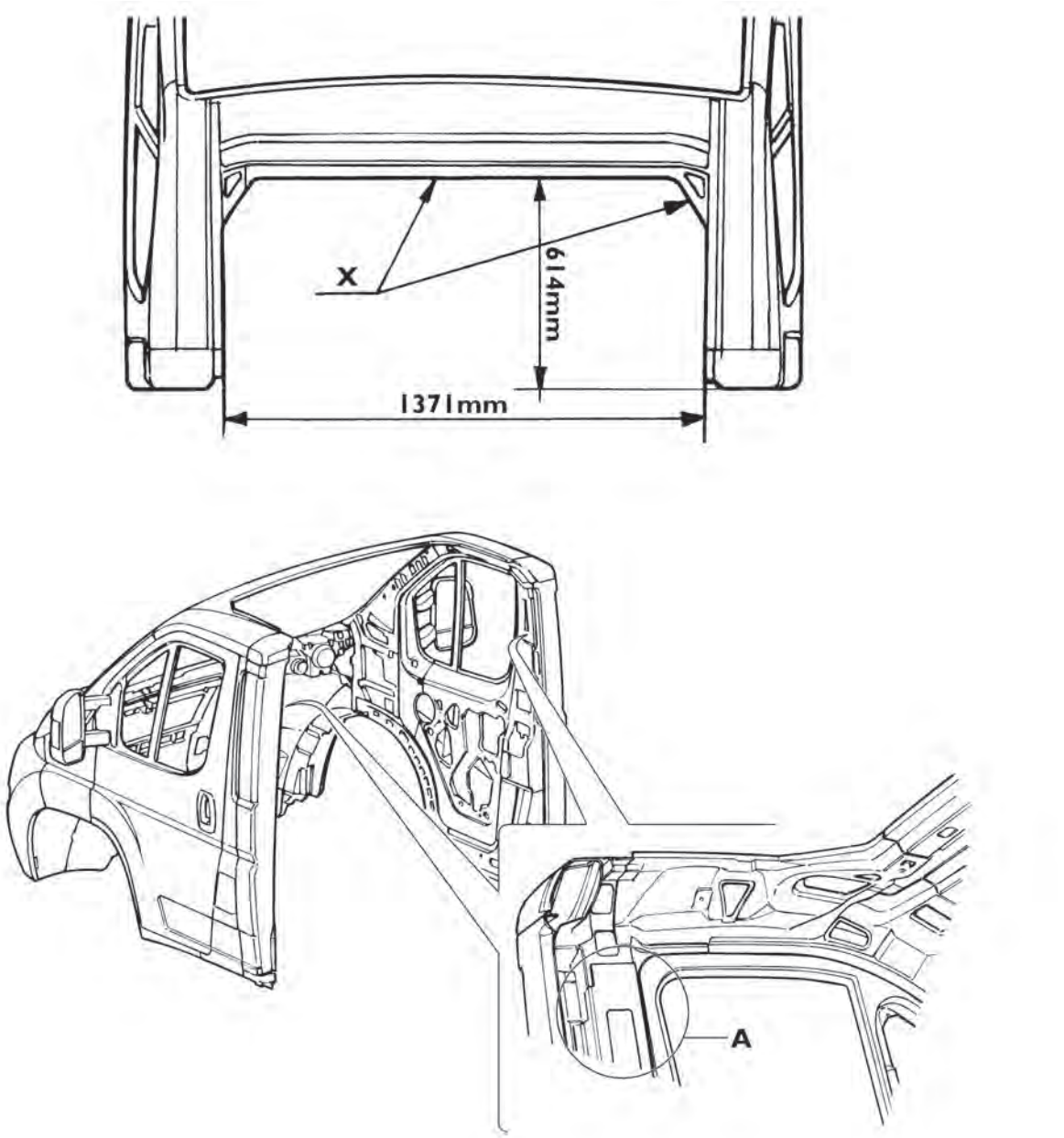
Warning: failure to observe the indications provided may result in serious engine damage.

Modifications to the roof

Instructions for cutting roofs of chassis cabs with OPT 59E.

The cab roof can be cut as shown below:





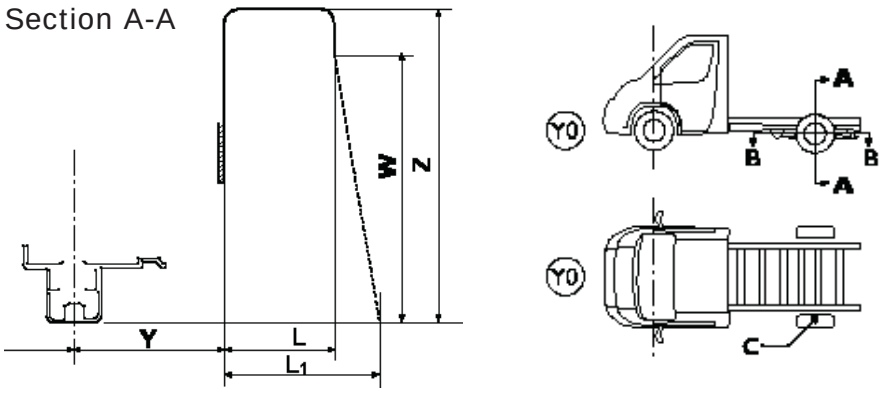
X: maximum permitted limit cutting roof.

Installations and modifications to realise specific versions must be carefully carried out in order to safeguard structural rigidity and maintain the function and protection offered by the cab, as well as the seat belt top anchor points (see detail A).

Wheelarch dimensions

The graphic shows the maximum wheel excursion with the vehicle in use.
Respect the dimensions given when modifying the wheel arch.

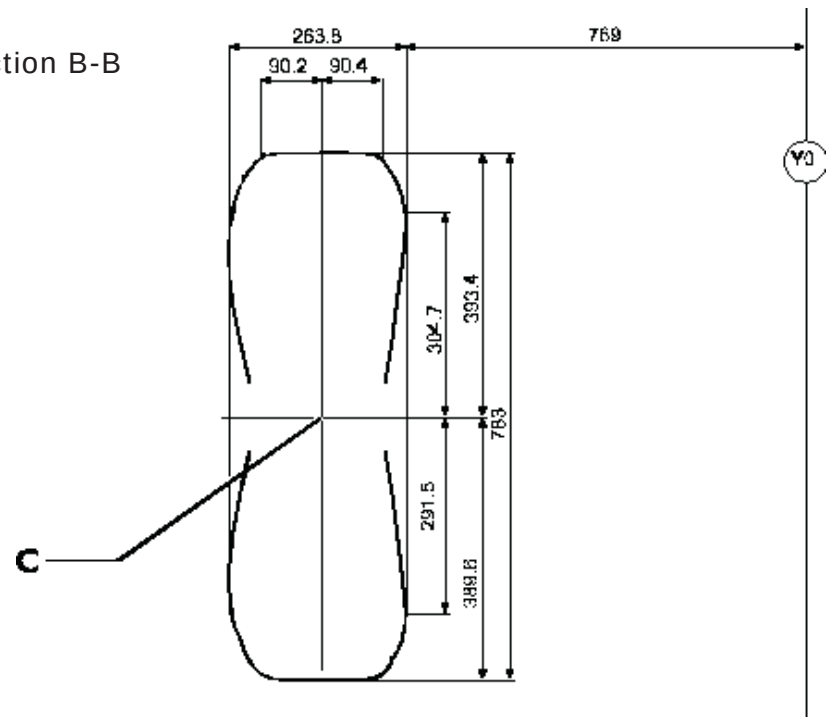
Section A-A



Track	Tyres	Y	L	L1	W	Z
Normal	225/70 R15 C	83	290	365	350	400
	225/75 R16 C	83	290	380	370	450
Widened	225/70 R15 C	173	300	365	350	410
	225/75 R16 C	173	300	380	370	460

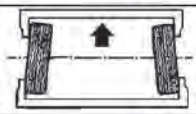
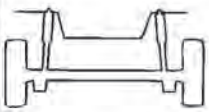
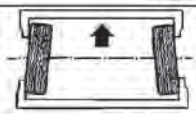
NOTE: The values given in the diagram include maximum play of 10 mm in relation to tyre (without chains) in conditions of asymmetrical jolting with maximum buffering.

Section B-B



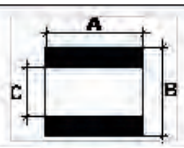
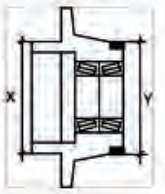
Wheels and suspension

For vehicles converted by coach-builders, a check on toe-in and suspension geometry must be made by the coach-builder/converter, prior to handing the vehicle over to the customer (tractor cabs only).

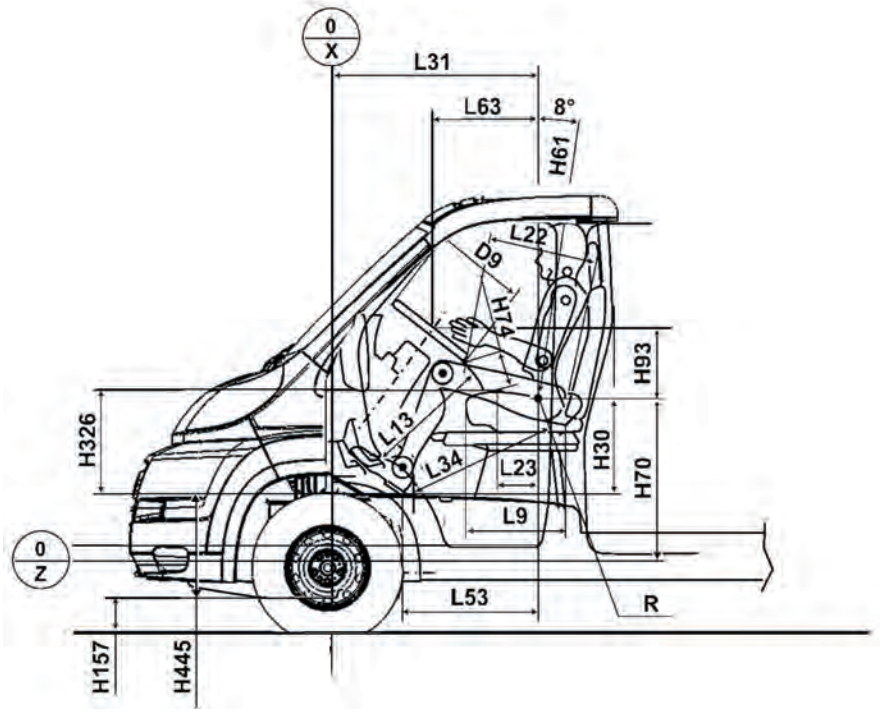
WHEEL TRIM		ALL VERSIONS
		 Vehicle unladen (*)
 Front suspension	Camber (**) 	0° ±30'
	Incidence (**) 	1° 30' ±30'
	Toe-in 	-1 ±1 mm
 Rear suspension	Camber (**) 	0° ±30'
	Toe-in 	0 ±1 mm

(*) With tyres inflated to required pressure with vehicle ready for road
(**) Angles not adjustable

WHEEL BEARINGS

	FRONT	Rear LIGHT	Rear HEAVY	
A	54	76	76	
B	90	X=72 Y=100,950	X=79 Y=100,950	
C	55	42	42	

Cab habitability diagram

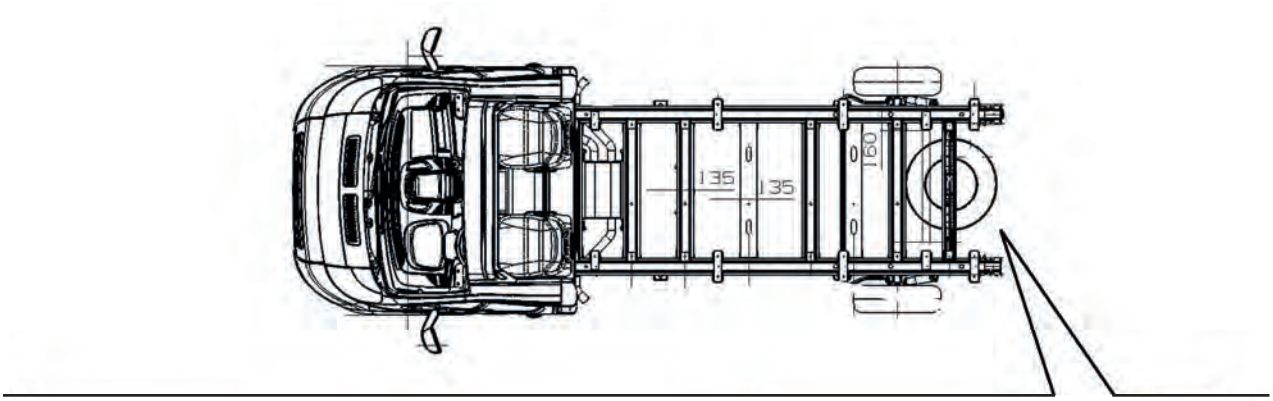


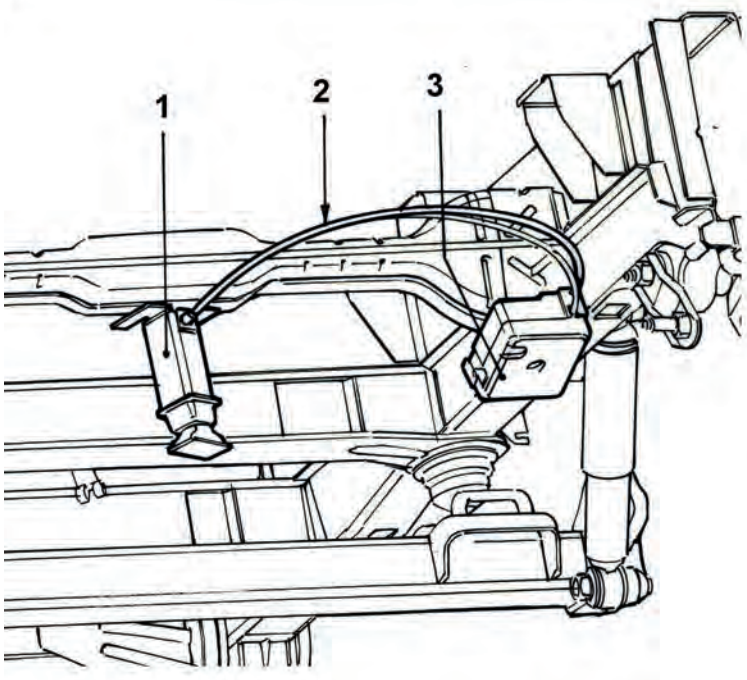
Reference	mm
d9	390
h30	435
h61	1081
h70	740
h74	165
h93	330
h157	199
h326	450
h445	257
l9	500
l13	635
l22	523
l23	170
l31	1004
l34	985
l53	670
l63	465

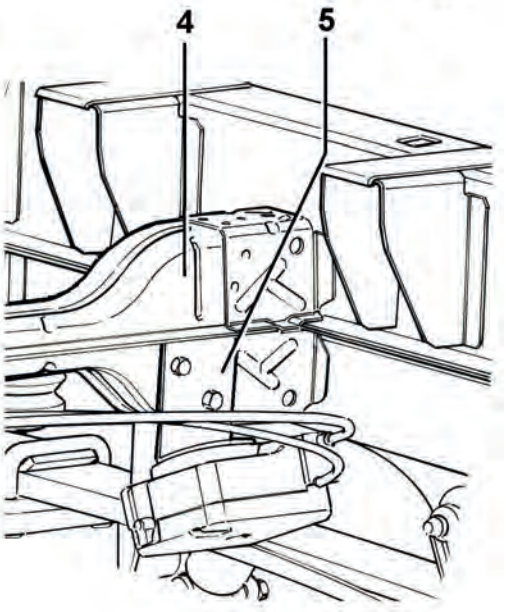
Spare wheel

The spare wheel is positioned in the rear part of the vehicle, in the external compartment under the chassis.
The complete device is fastened to the cross-member (4):
- at the centre by the wheel lifting/lowering cylinder (1),
- to the side by the control (3) with cables and brackets (5).

Spare wheel position for chassis cab and basic chassis versions







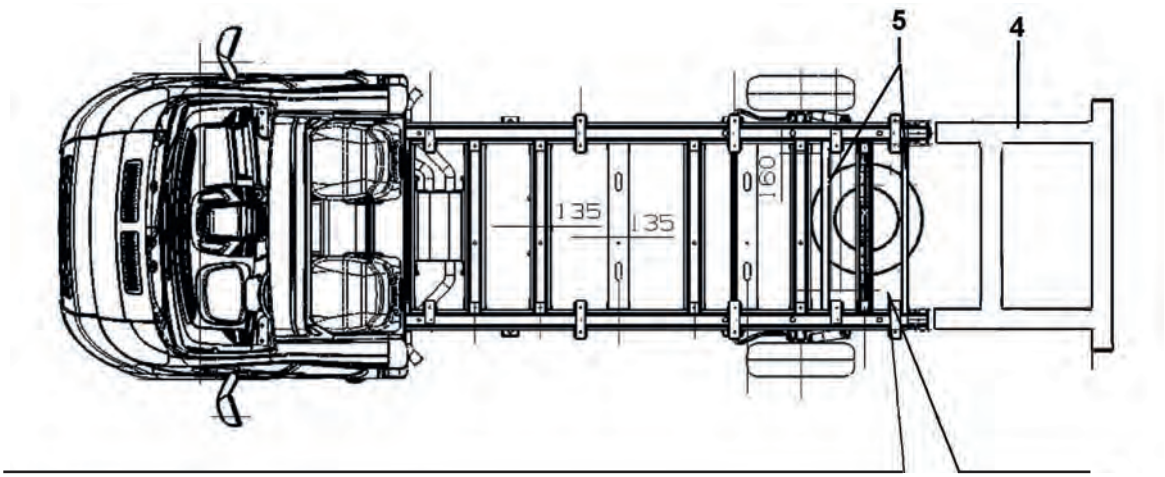
Relocation of spare wheel for chassis cab and basic chassis versions

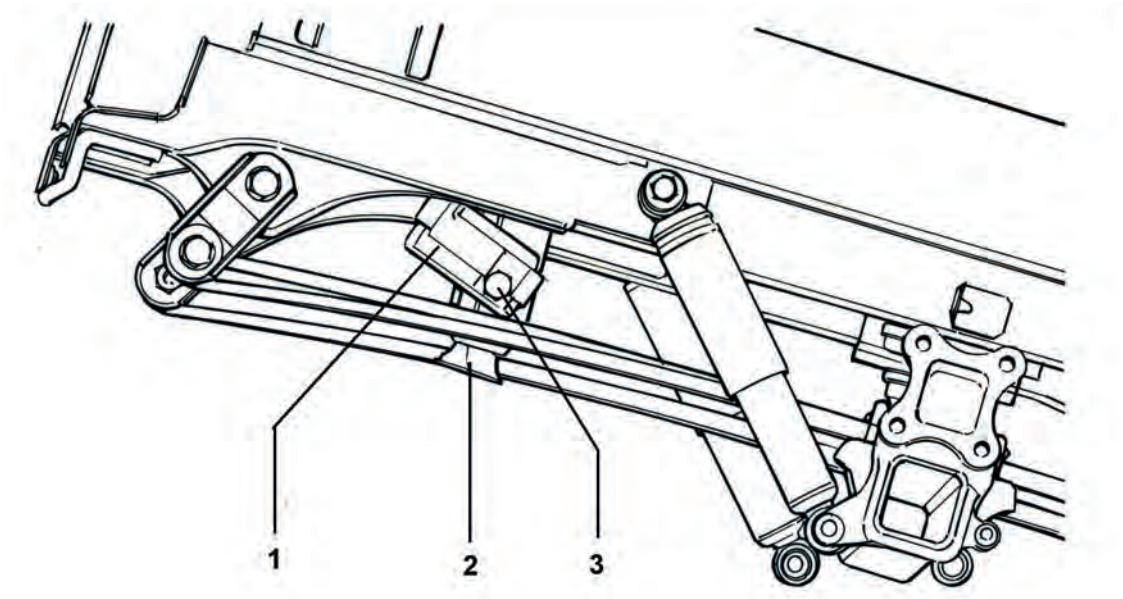
If the spare wheel mounting (3) and (2) has to be repositioned (for instance for lengthening the overhang, see detail 4), the anchor points must b transferred to the new structure, at the same distances used for its installation on the original vehicle (see drawings on previous page).

In this condition the device will function correctly.

When repositioning, easy access must be maintained not only to the spare wheel, but also to the control must (detail 3 in diagram below).

NOTE: restore the wheel upper fastening points by means of two cross members (5).



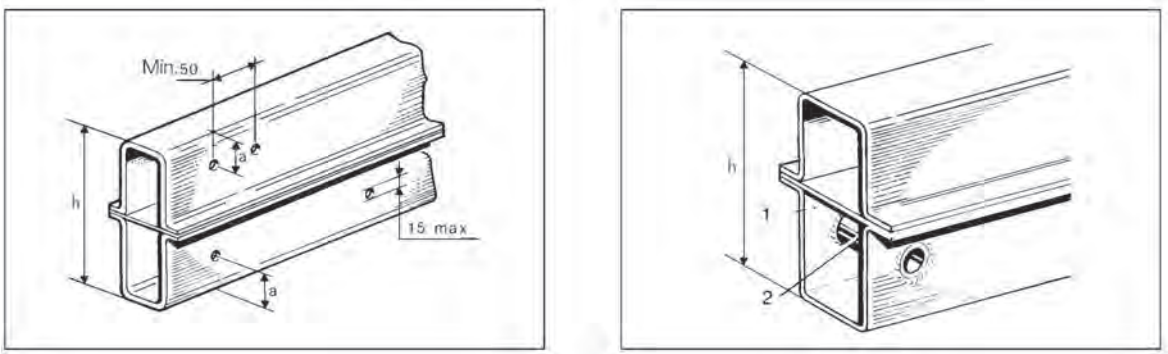


Indications for connecting superstructures

Drilling holes in the chassis

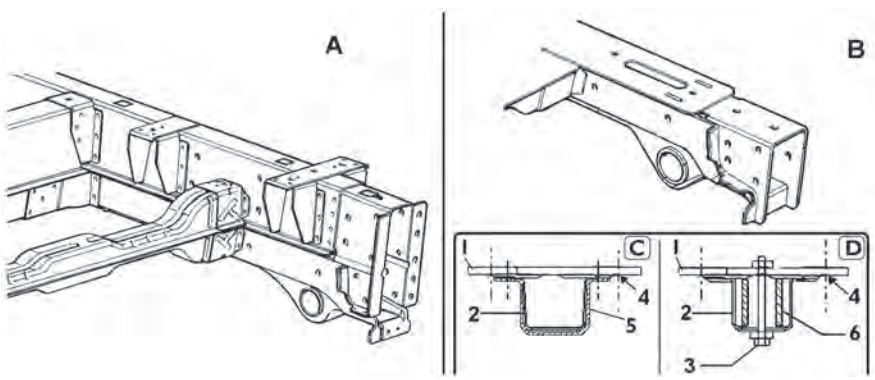
To fit additional assemblies to the chassis or bodyshell, as a general rule existing holes should be used.
If new holes have to be made they should be made on the vertical wall of the longitudinal member and thoroughly de-burred and reamed.
For the drilling, keep to the figure, and so:
- under no circumstances should the dimension 'a' be less than 30% of the chassis height (h);
- the distance between adjacent holes must never be less than 50 mm;
- the maximum diameter of the holes must not exceed 12 mm;
- the new holes must not be made near areas under greater stress, such as: areas for spring mountings, shock absorbers, brackets, crossmember attachments.

When necessary, fit spacers in the original structures. Make the weld as shown in the diagram and then apply corrosion protection.



1- Chassis; 2 - Spacer bush

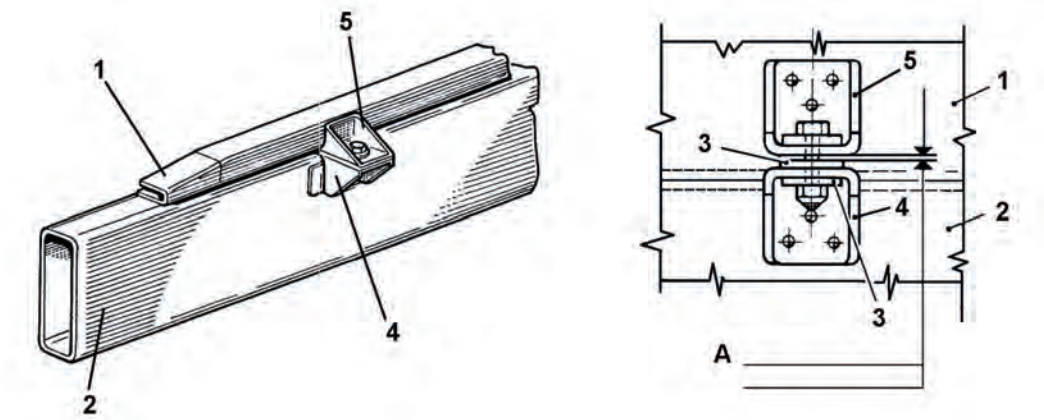
For chassis cab versions with sub-frame, superstructures can be mounted on the upper longitudinal member present on the basic version (fig. A). For 'special' versions, holes are provided for use as shown in figure (B).



1: upp. plate - 2: longitudinal member - 3: attachment - 4: reinforcing plate
5: superstructure fastening holes - 6: box-member reinforcing bush.
C: fastening solution with addition of an external U-bolt.
D: fastening solution with addition of internal bush.

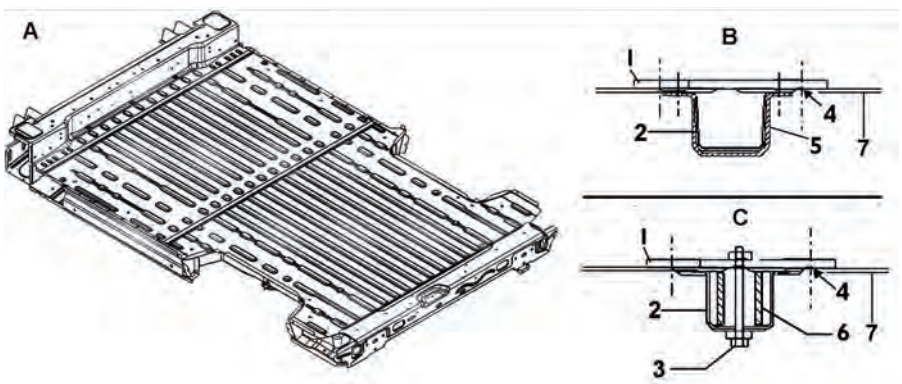
Fitting the counterframe

The purpose of a counterframe is to ensure an even distribution of the loads over the vehicle frame and to contribute to the stiffness of the vehicle as a function of its intended job.
For its construction, keep in mind that the material must have good mechanical weldability properties. The elements anchoring the counterframe to the vehicle frame must be designed to ensure a stable connection under the effects of lengthwise and crosswise thrusts (due to the loads when cornering and when the brakes are applied).
Interpose an elastic block, made of canvas rubber or a similar material with Shore hardness < 70, under the first fastener at the cab end. Interpose rigid spacers under the other connections.



1: Counterframe; 2: Frame; 3: Spacer; A: Gap between the frames: 4-5 mm.
4: Bracket on frame; 5: Bracket on counterframe.

'Special chassis-cab with flatbed' versions come with holes that can be used as shown in figure (A).

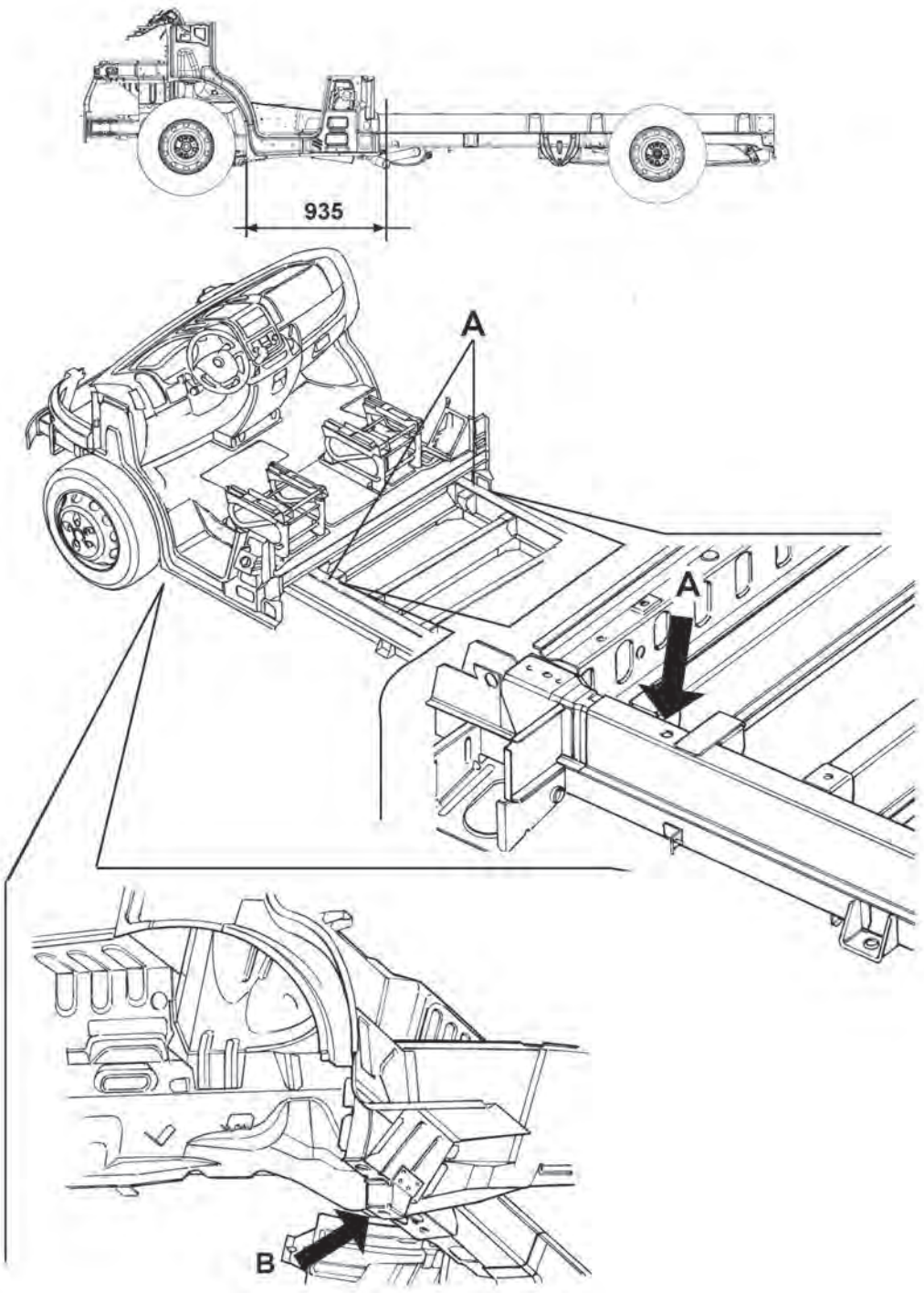


1: Upper plate - 2: Longitudinal - 3: Connection - 4: Anchoring screws
5: Boxed reinforcement
U-bolt - 6: Boxed reinforcement bushing - 7: Flatbed.
B: Fastening solution with the aid of an external U-bolt.
C: Fastening solution with the aid of an internal bushing.

Note: for box-bodies or dropside it's suggested to keep a maximum distance between structure and body not exceeding 80 mm.

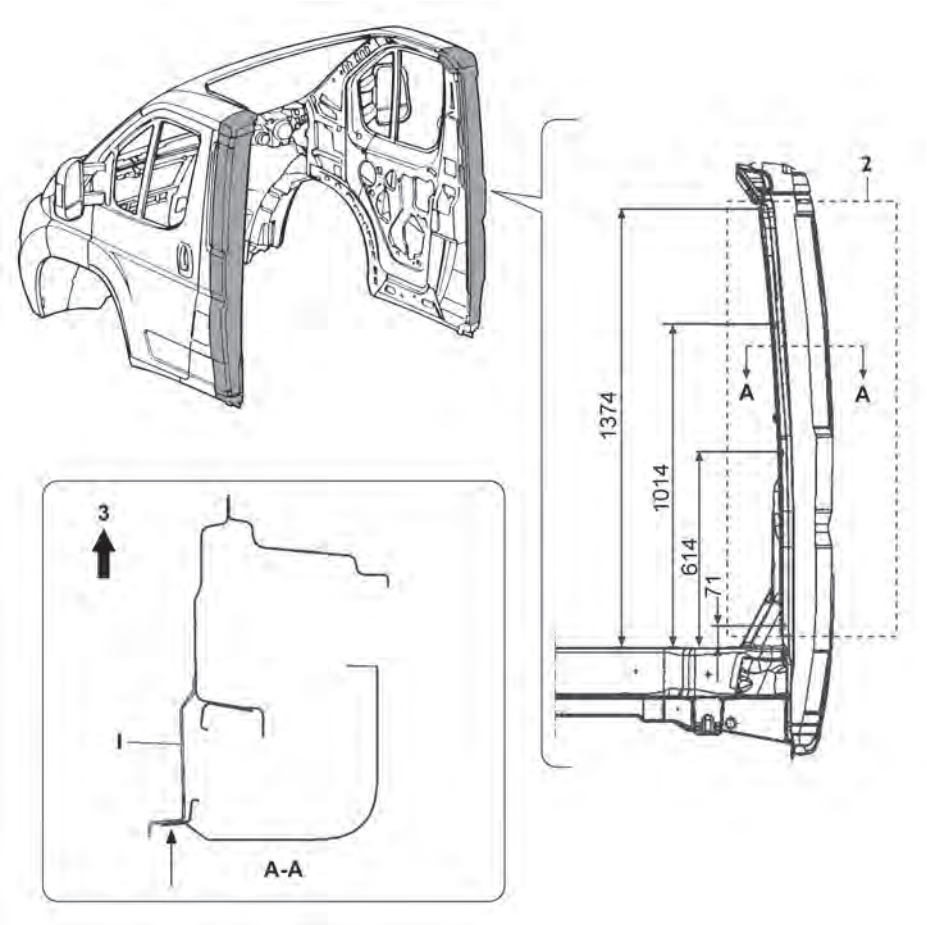
Plan and reference holes for superstructure application (Camping Car)

Reference holes for superstructures



A: reference holes for conversion works by coach-builders;
B: bodyshell reference points.

Cab interface for application of superstructure (Camping Car)

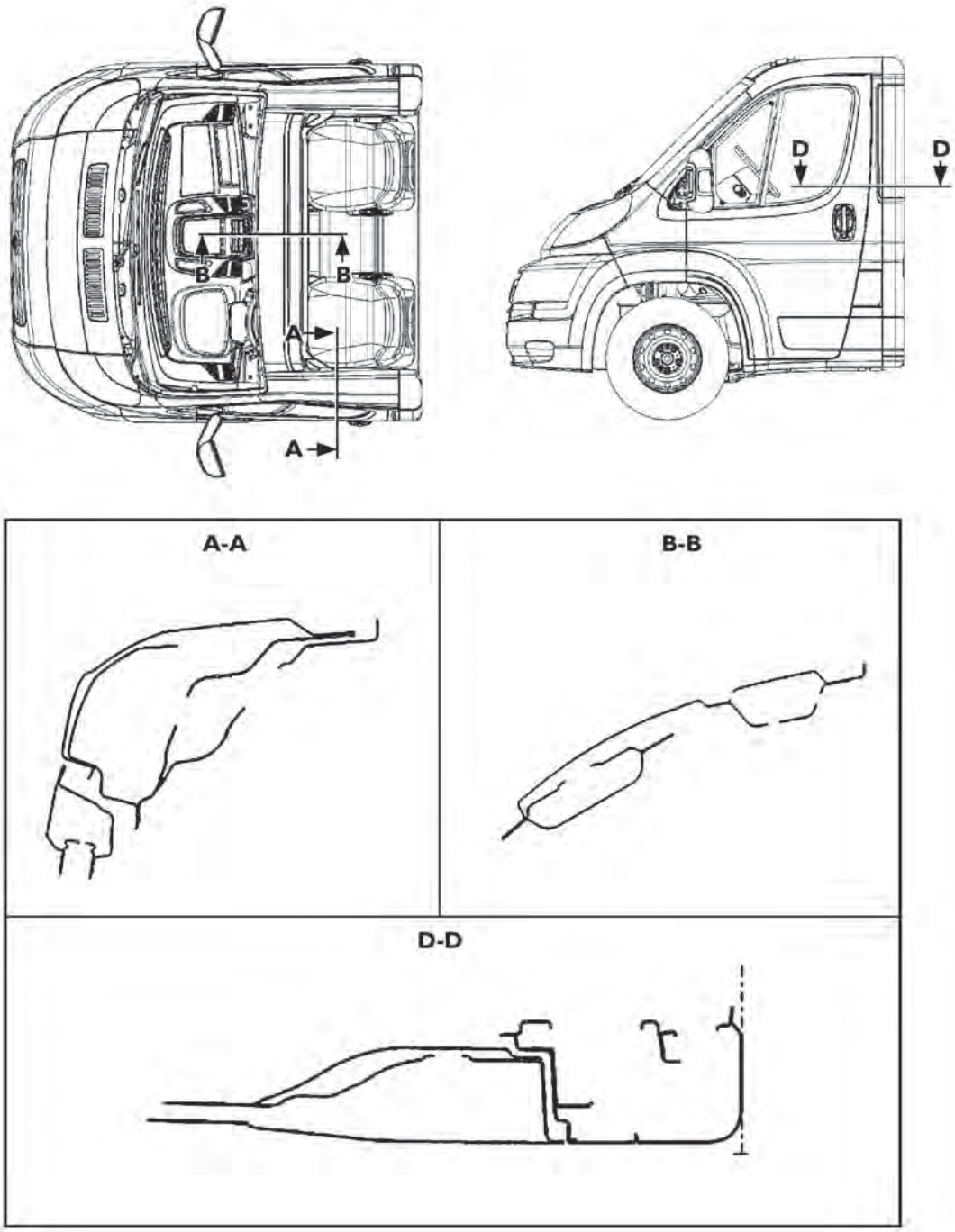


1: structural reinforcement; 2: recommended interface area; 3: direction of travel.

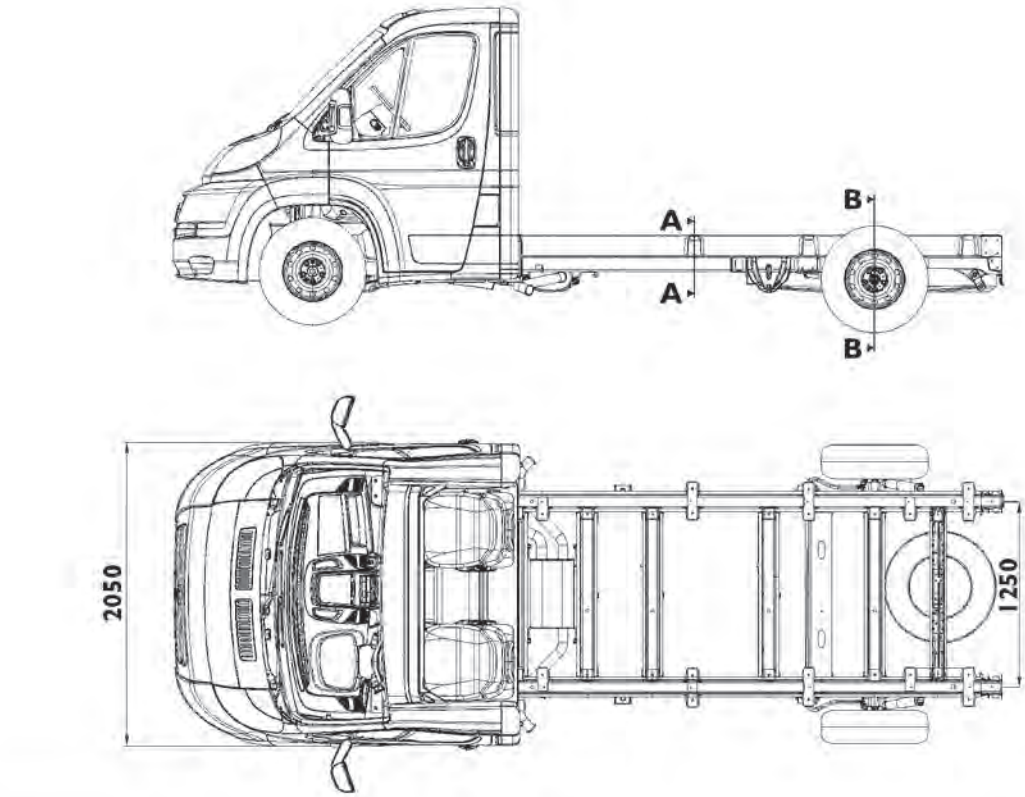
In the 'cut roof' chassis cab version the angular structure of the side/rear wall, has reinforcement (1).
If it is considered necessary to interface a new structure with the cab of the basic vehicle, we recommend using the reinforcement (1) as anchor point in the indicated position ( ).
The configuration of the basic vehicle structure, shown in section A-A, is the same along the entire area indicated in the drawing by (2).
The drawing shows the recommended distances between the various interface points between the structures.

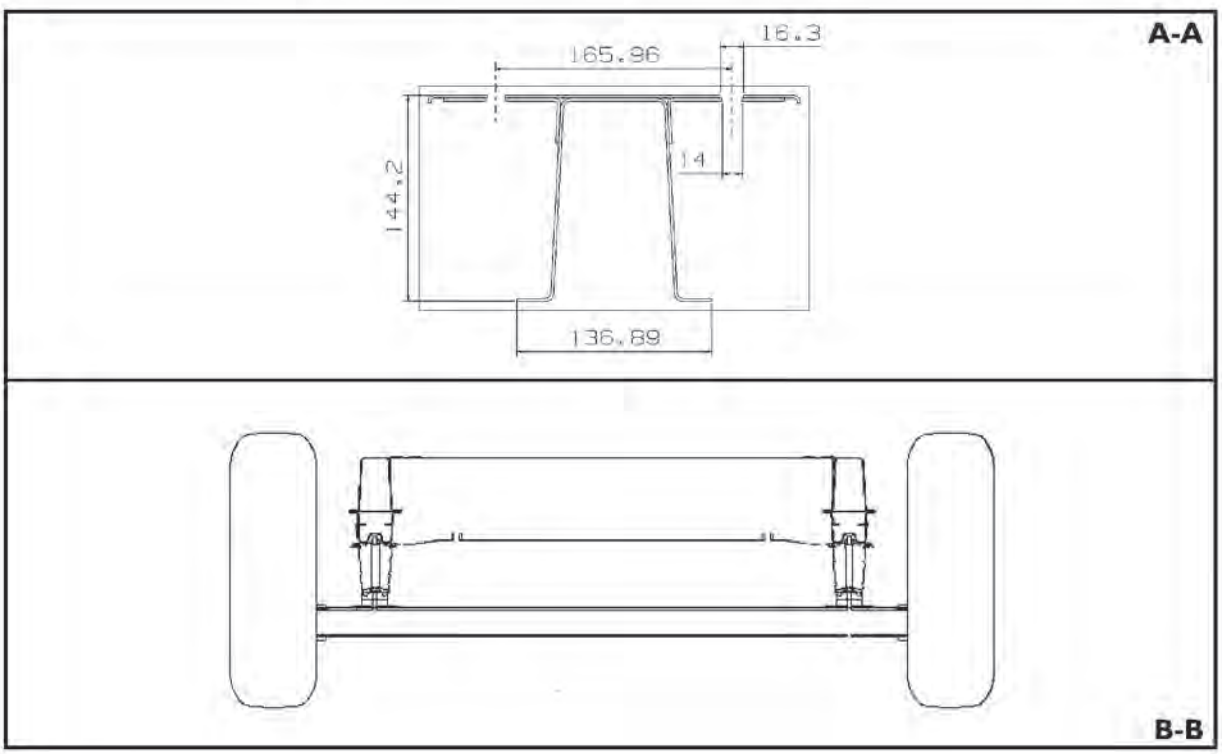
The main sections of all versions are given below. These provide general information on the condition of the structure and are strictly for information only.

Cab sections

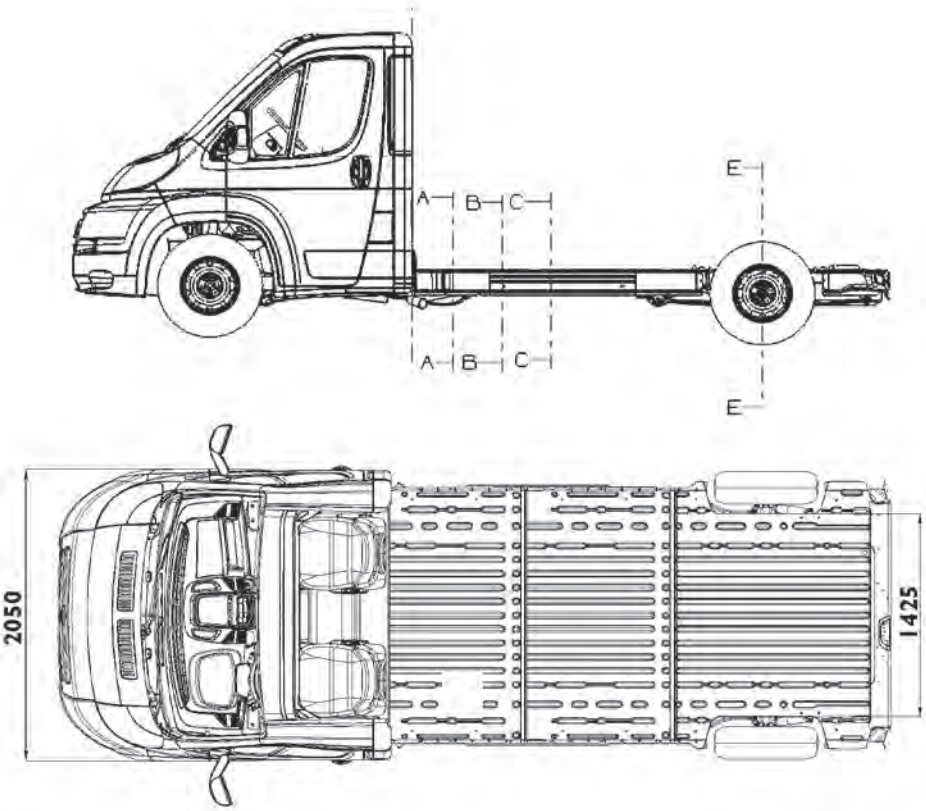


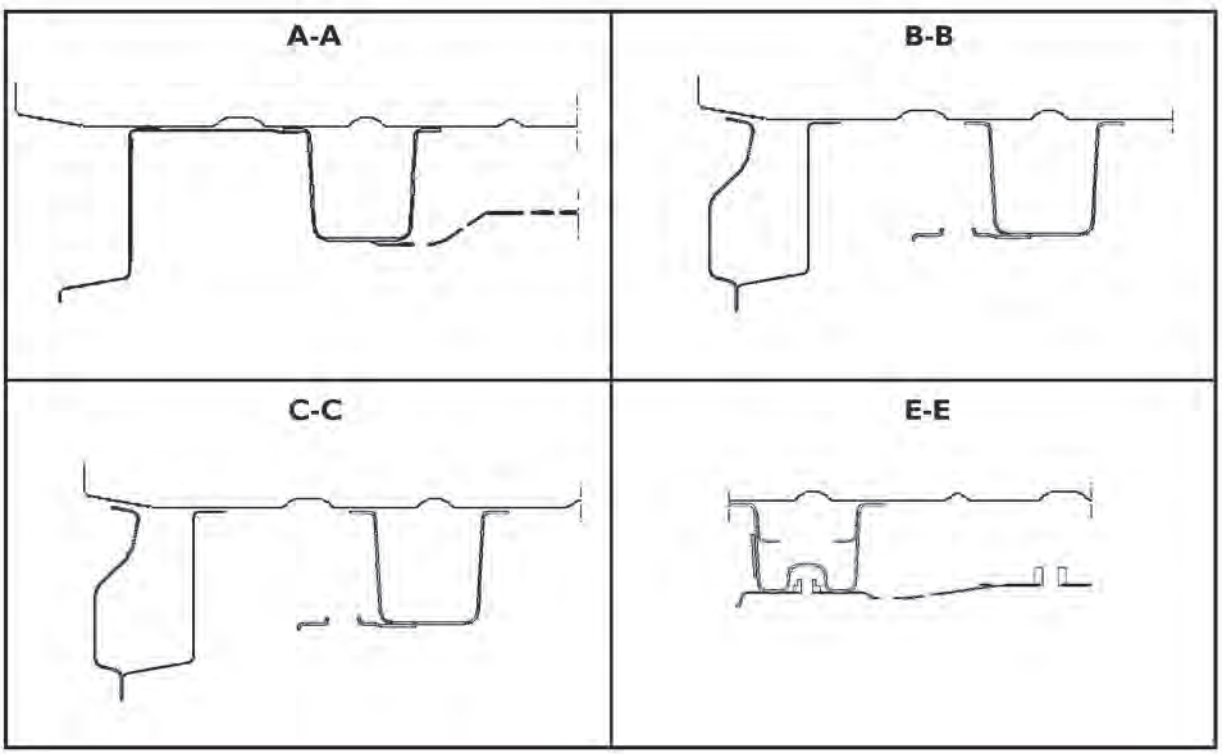
Chassis cab sections



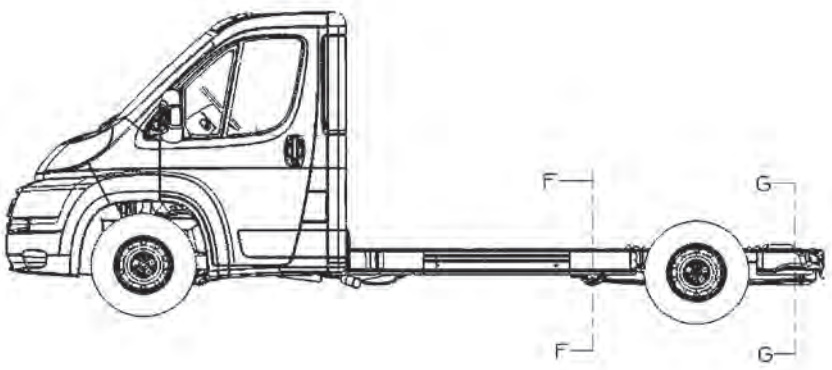


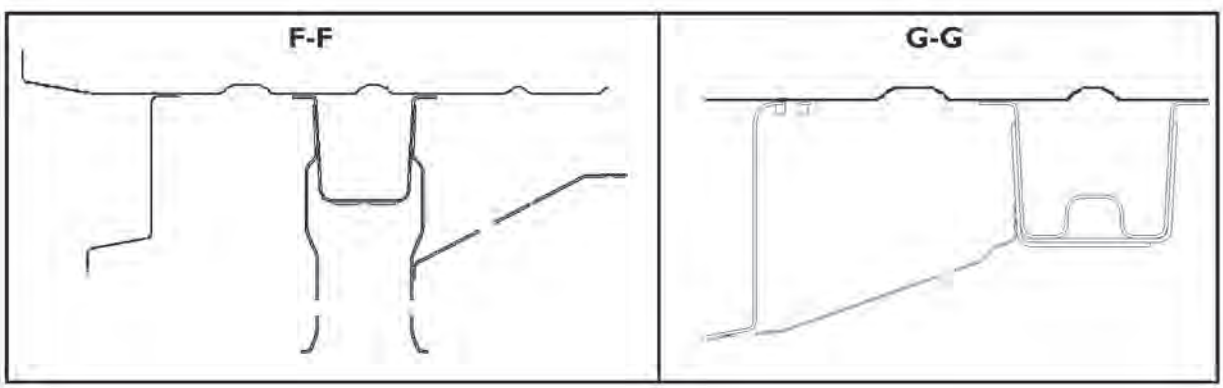
Chassis cab with platform version sections



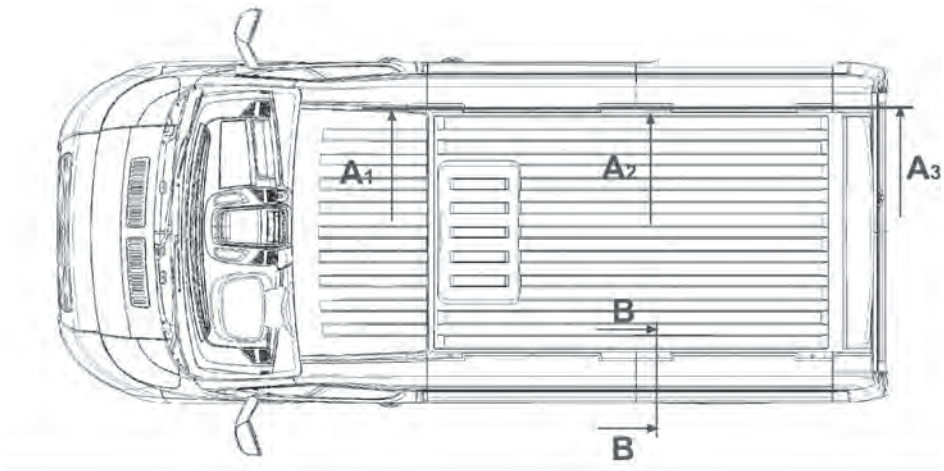


Chassis cab with platform version sections

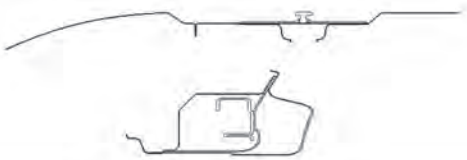




Van roof sections

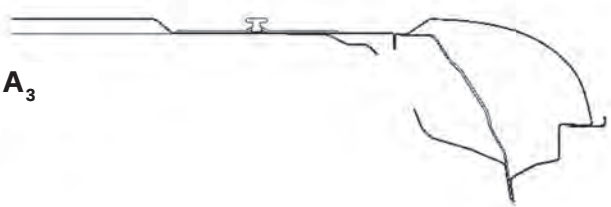


SEC. A_1

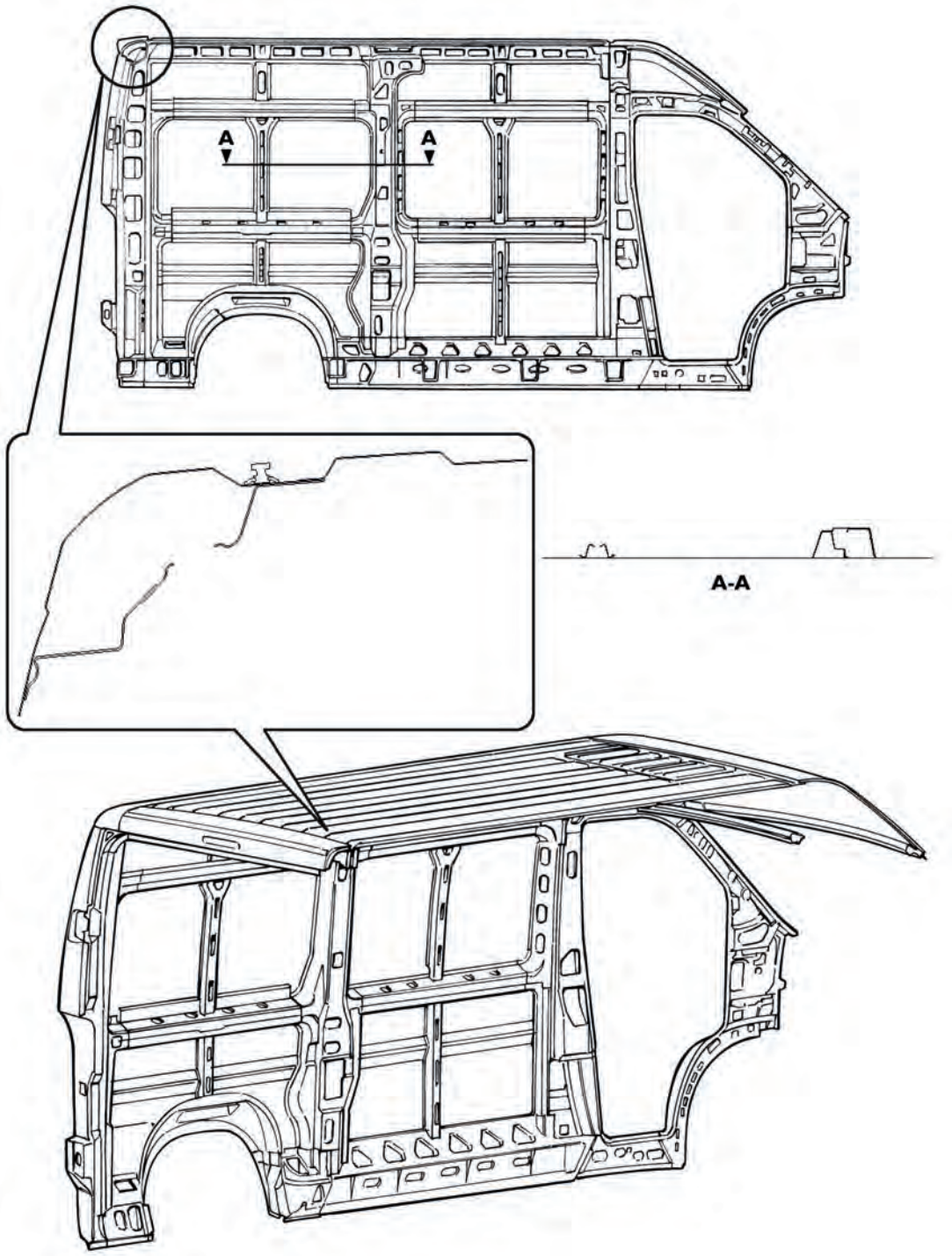


SEC. A_2

SEC. A_3

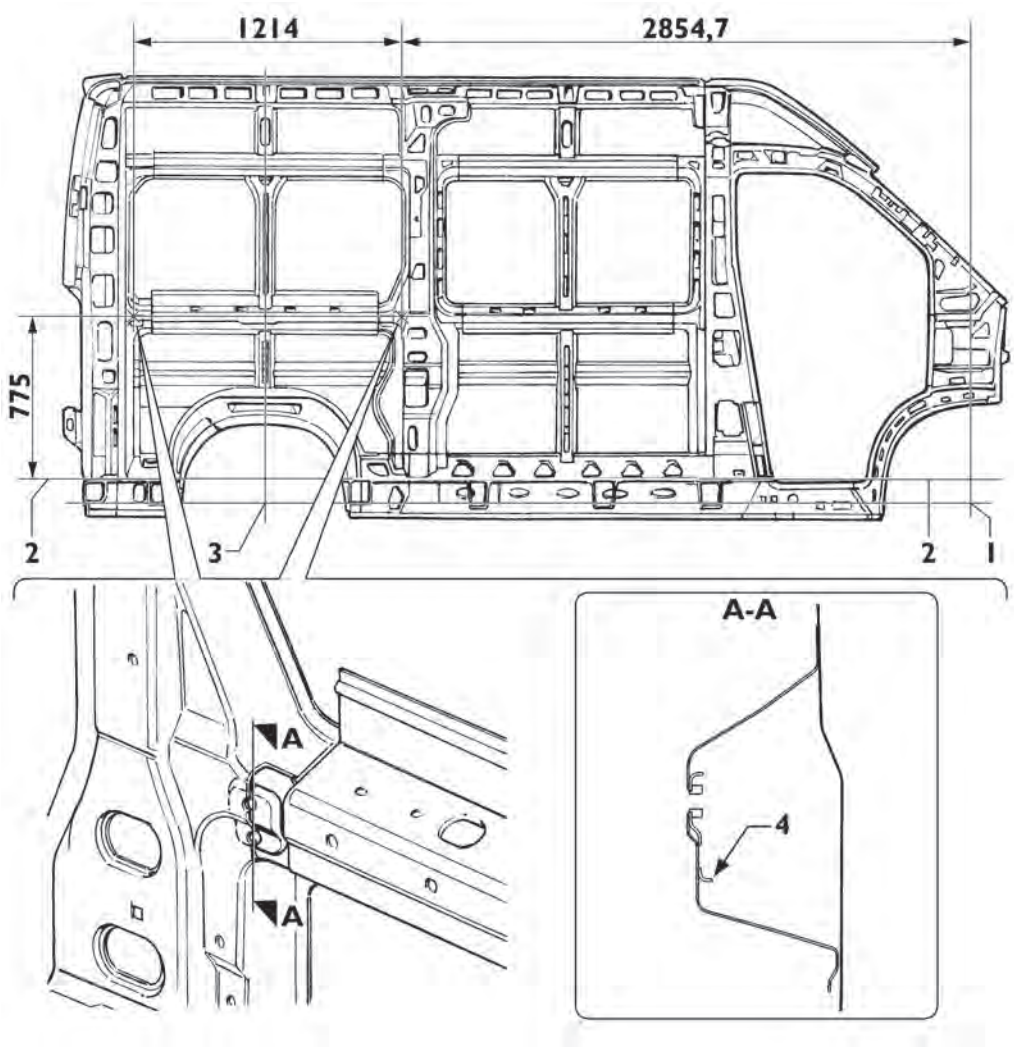


Van side sections



Side Load Retention

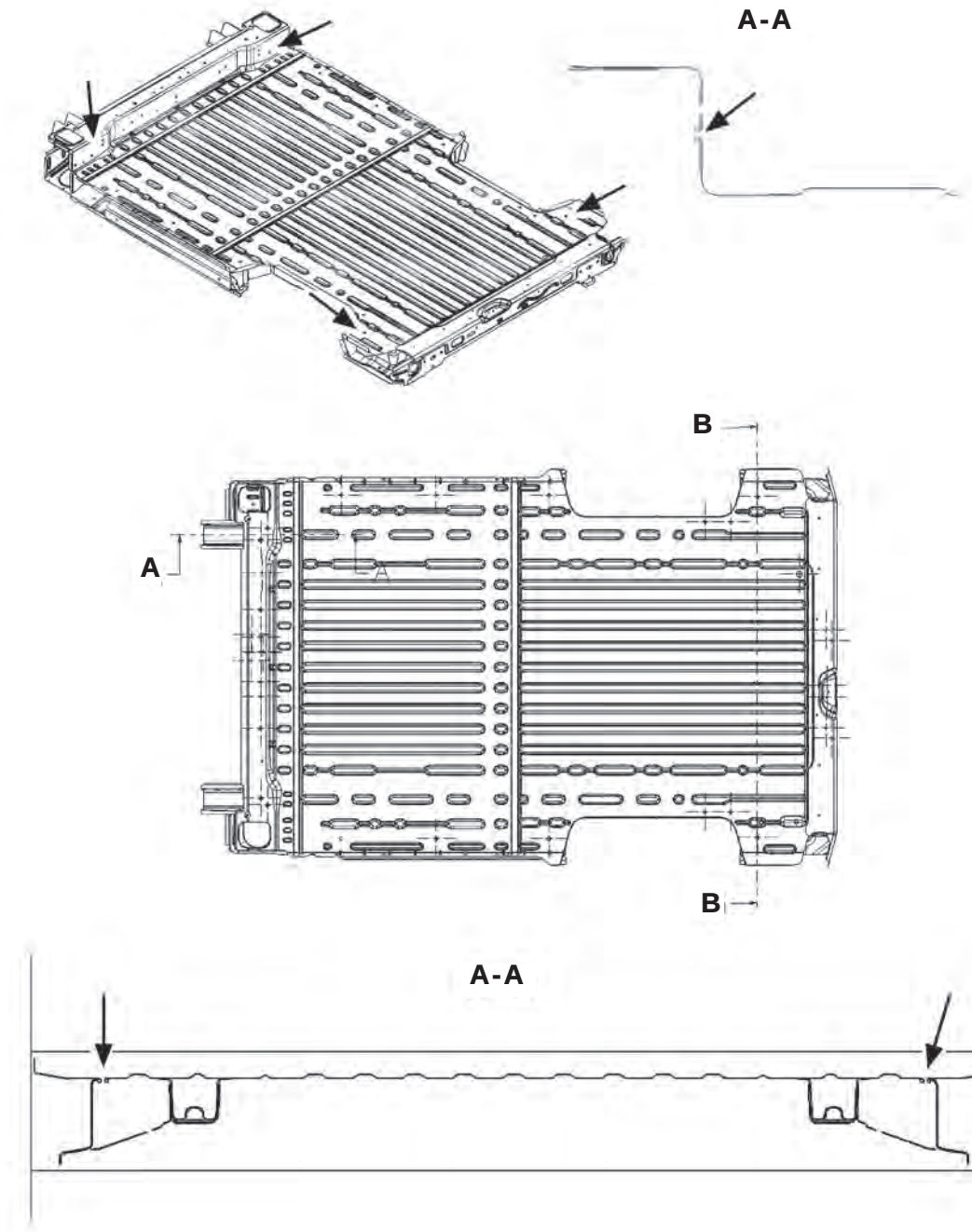
The quantity and relative position of the anchor points for loads are the same as those for all ‘van’ version wheelbases.
The anchor points are shown below.



1: FRONT WHEEL CENTRE;
2: UPPER FLOOR PROFILE ALIGNMENT;
3: REAR WHEEL CENTRE;
4: LOAD ANCHOR REINFORCING.

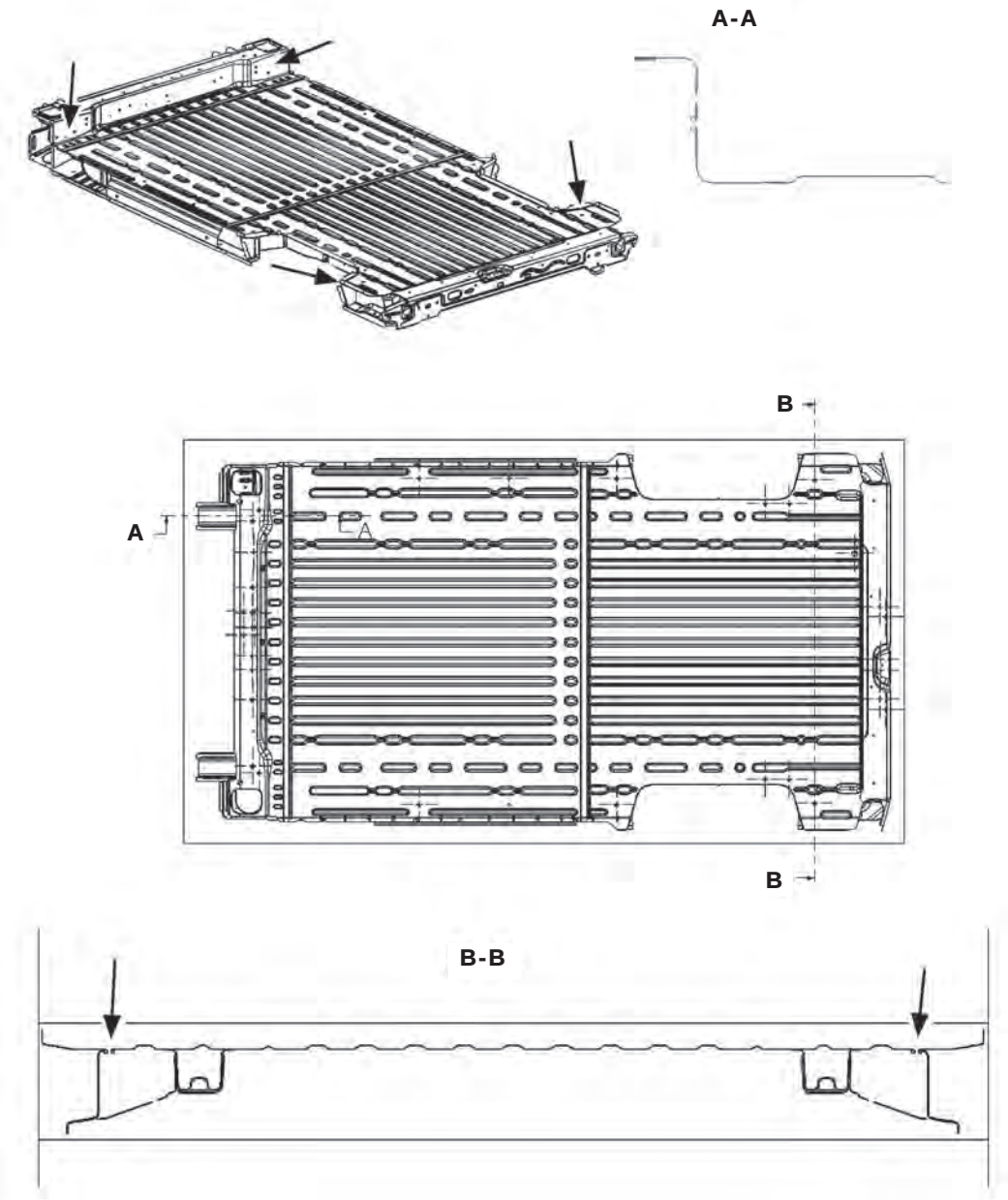
Load retaining hooks on floor

Short wheelbase



Load retaining hooks on floor

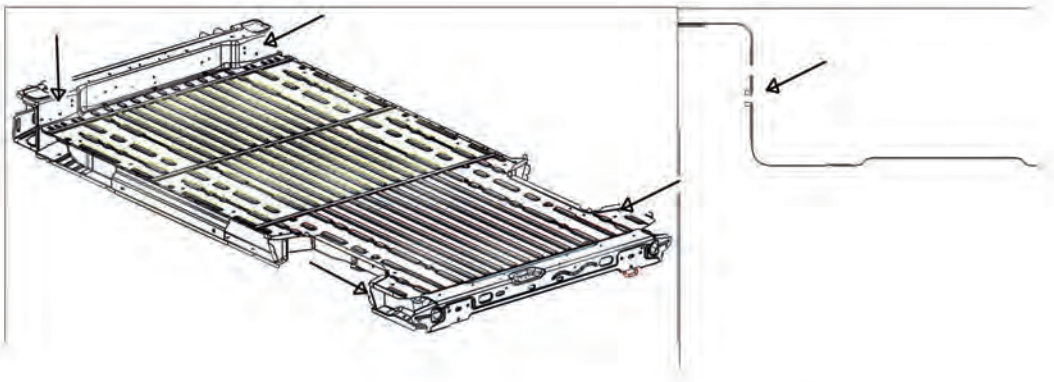
Medium wheelbase

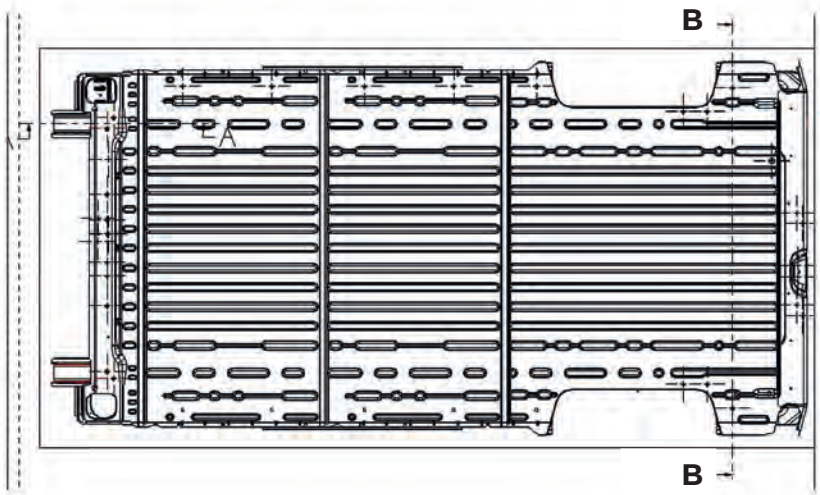


Load retaining hooks on floor

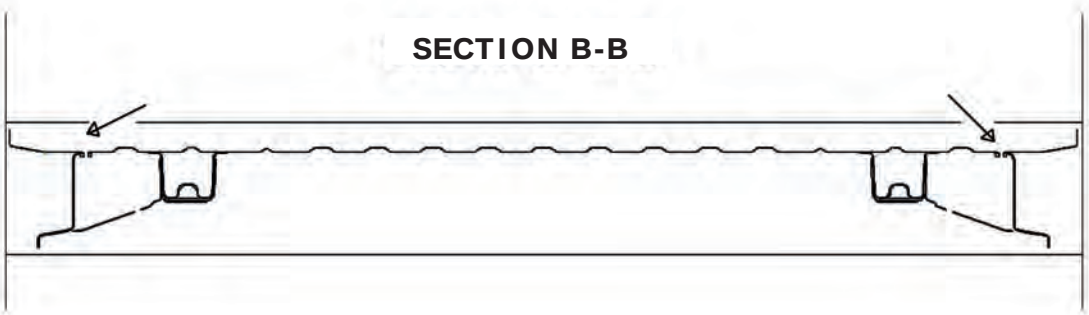
Long wheelbase

SECTION A-A





SECTION B-B

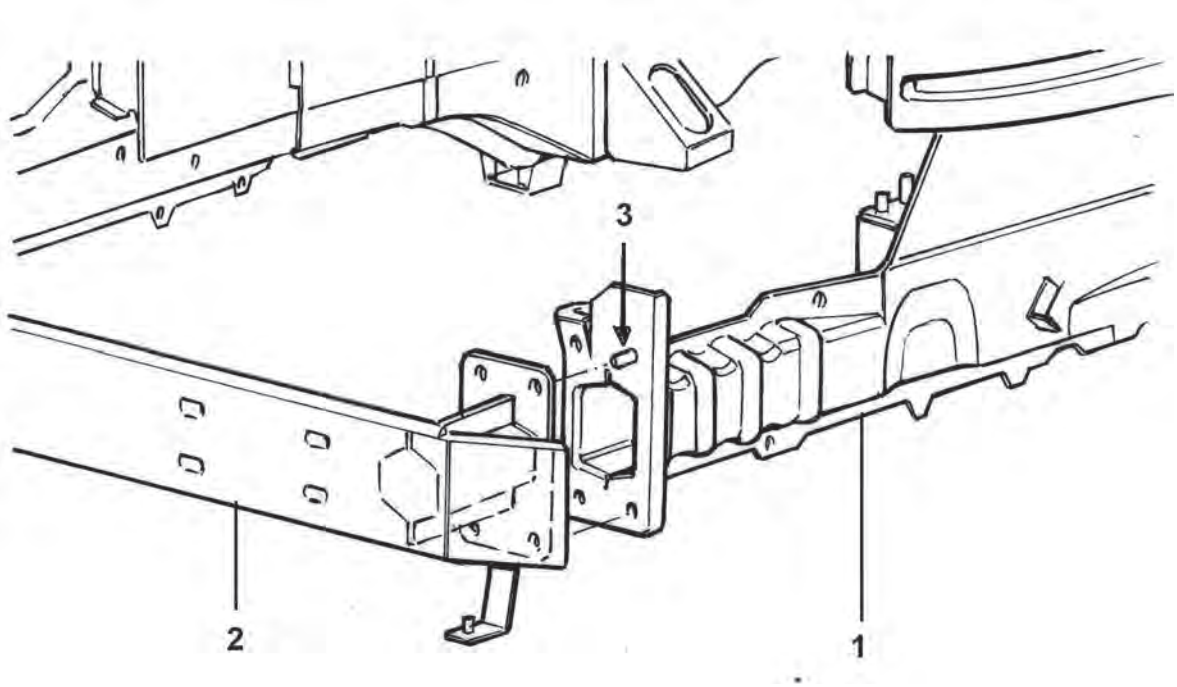


Instructions for eliminating 'crash box' cross member (only for vehicles without air-bag)

All basic versions are fitted with impact absorbing cross-members.

Removal of the cross-member is only possible in cases of vehicles without airbag ('chassis-cowl' versions).

Front crash-box for all versions



2: front crash box cross-member - 1: controlled impact absorption strut
3: centring pin.

NOTE: for vehicles fitted with air-bag, restore the structure with technical specifications similar to those removed.

Fuel supply system

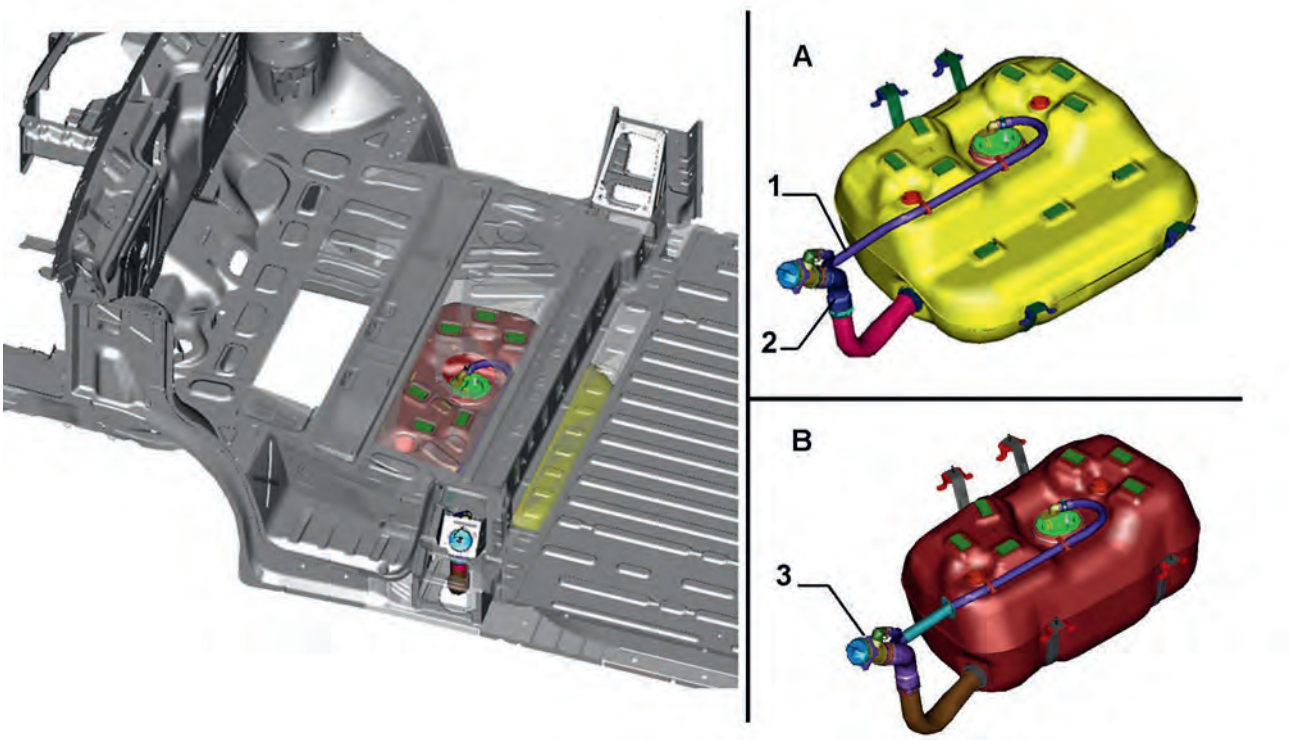
The fuel supply system is identical on all versions (vans, basic chassis vehicles, etc.)
The passage cone for the fuel filler pistol (model VP std. SAE J 1140) is shown on the drawing given below.
The tank capacity is 60 lt (optional), 90 lt (standard) or 120 L (optional).

Modifications to fuel filler position.

A corrugated flexible pipe can be fitted between the tank and filler, taking care to comply with regulations in force.

If necessary the corrugated pipe (2) or pipe (1) must be replaced with others with the same technical specifications (materials, cross-section and fastening, see diagram on following page).

Descriptive outline

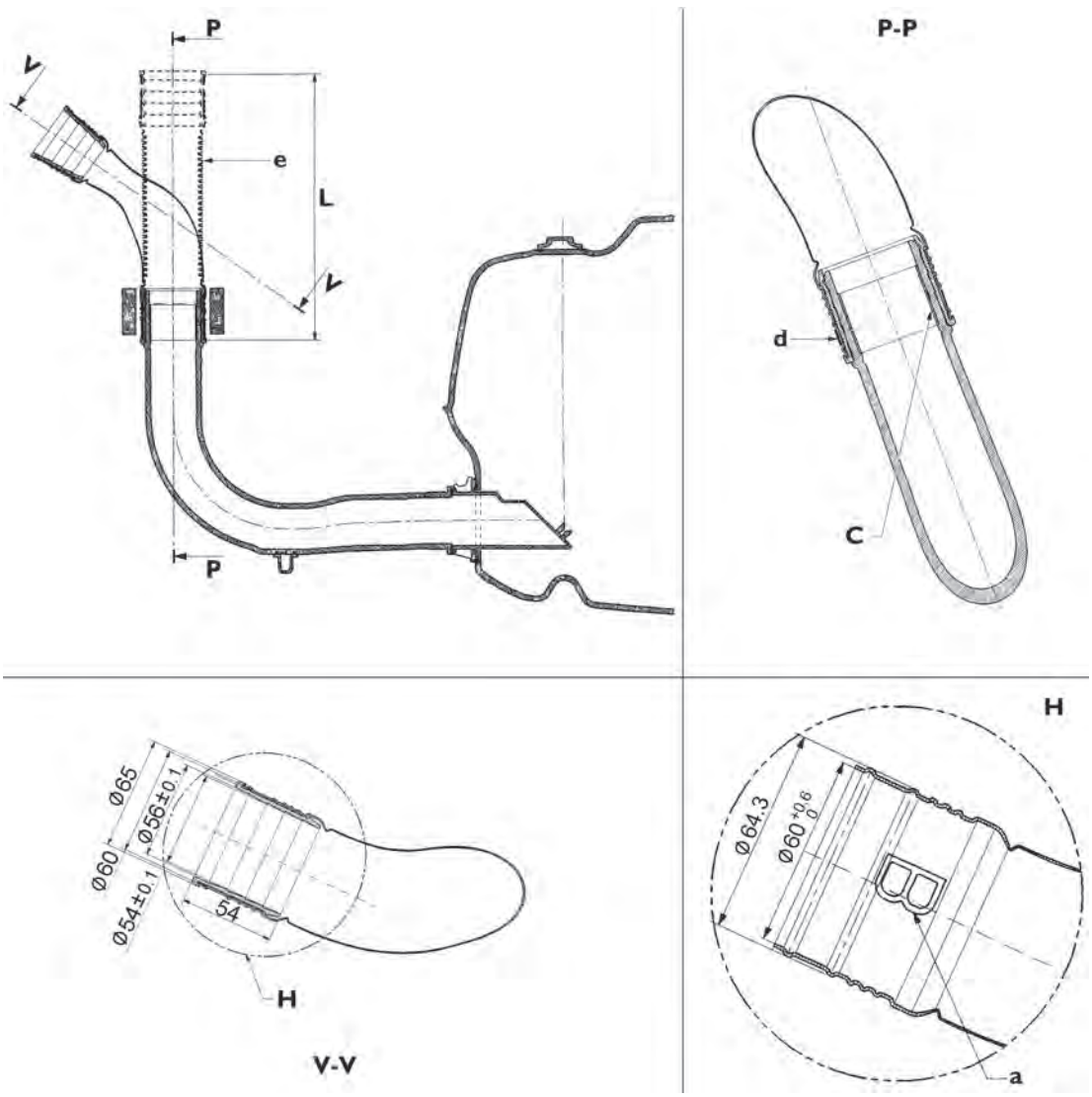


A: 120 L tank.
B: 90 L tank.
1: breather pipe; 2: corrugated connector pipe; 3: fuel filler

Pipe technical specifications

Component technical data:

a: letter in relief for correct mounting on vehicle;
c: metal insert with extraction load >= 100 N.
d: flexible collar;
e: nylon corrugated pipe;
L: max. length 261. 8 mm.



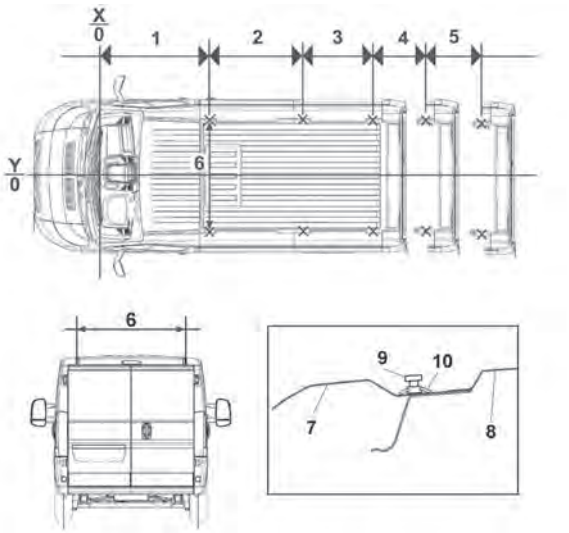
Fitting a roof rack

The roof rack must be fitted using the attachments on the roof, following the instructions of the roof rack manufacturer; maximum admissible load condition (including roof rack) must in any case be respected.

Short wheelbase - 150 Kg
Medium wheelbase - 150 Kg
Long wheelbase - 150 Kg

NOTE: The limit of 25 kg for each attachment on the roof must not be exceeded. The maximum permitted weight of 150 kg is an absolute limit, even if the wheelbase is lengthened.

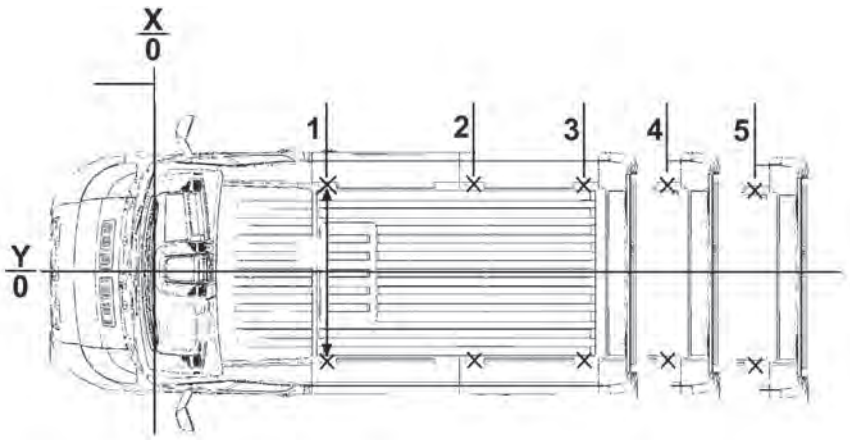
Diagram of roof rack attachment



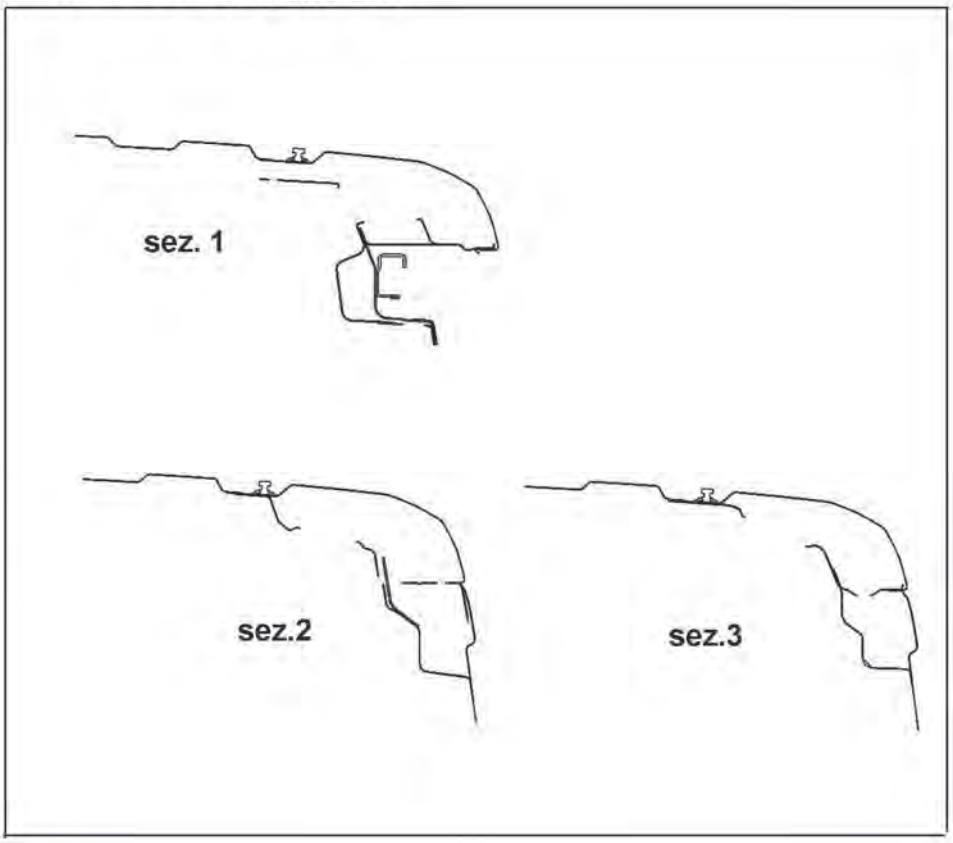
7. Top exterior. – 8. roof – 9. roof rack pin – 10. roof rack attachment reinforcement – X0. front wheel axis

	Anchor point distances (mm)					'Y' distance (mm)(width)
Load anchor point positions	1	2	3	4	5	6
Short wheelbase, low roof van (CH1)	1392.8	1244.7	920,5	-	-	740.0
Medium wheelbase, low roof van (MH1)	1392.8	1414.7	1201	-	-	740.0
Medium wheelbase, medium roof van MH2)	1392.8	1414.7	1193.5		-	740.0
Long wheelbase, medium roof van (LH2)	1392.8	1414.7	713.5	1065	-	740.0
Extra long wheelbase, medium roof van (XLH2)	1392.8	1414.7	713.5	716	714	740.0
Long wheelbase, high roof van (LH3)	1392.8	1619.7	509.0	927	-	747.5
Extra long wheelbase, high roof van (XLH3)	1392.8	1619.7	509.0	716	576	747.5

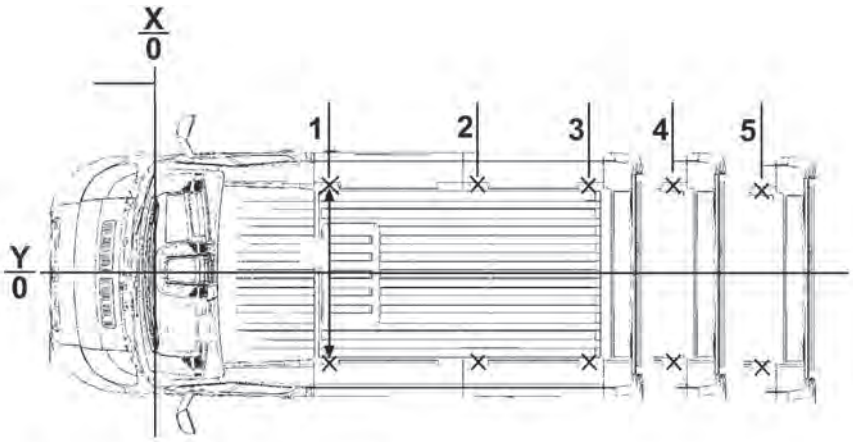
Roof rack attachment point sections



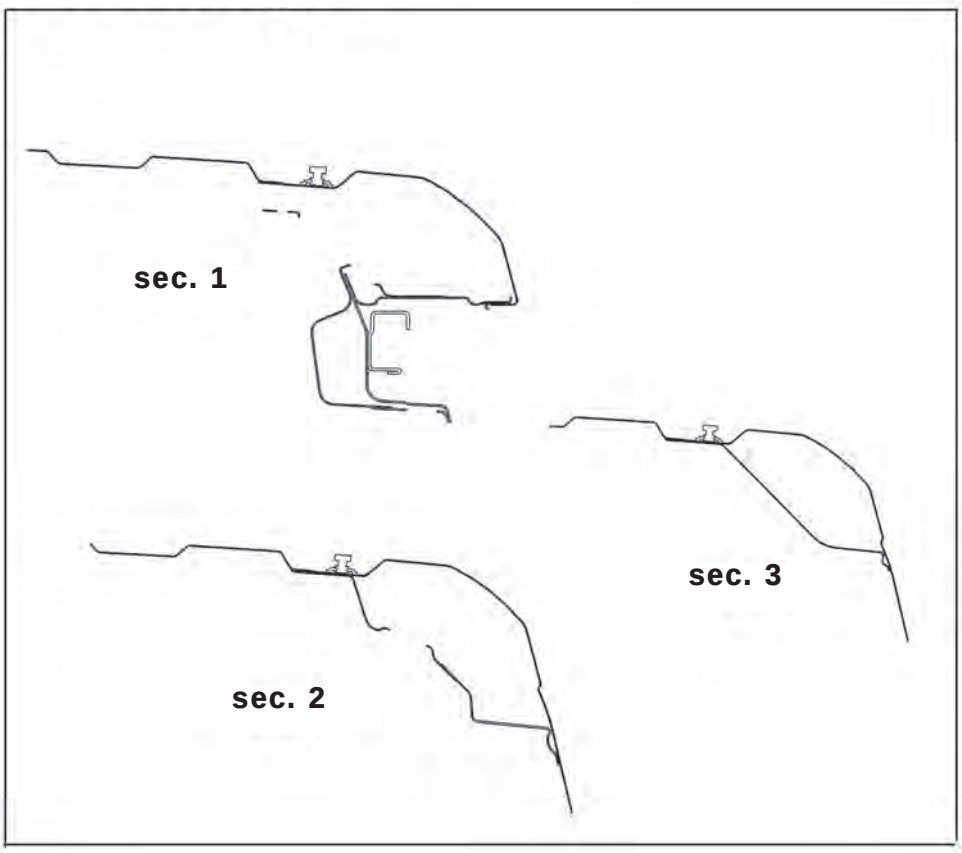
CH1 van sections



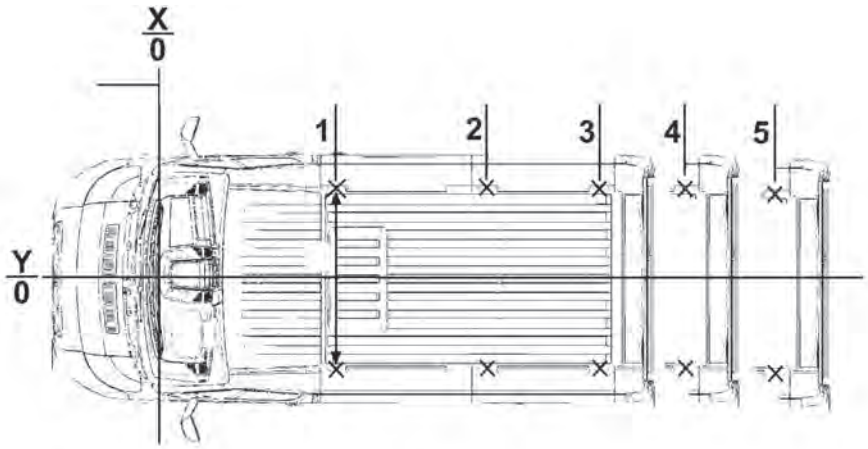
Roof rack attachment point sections



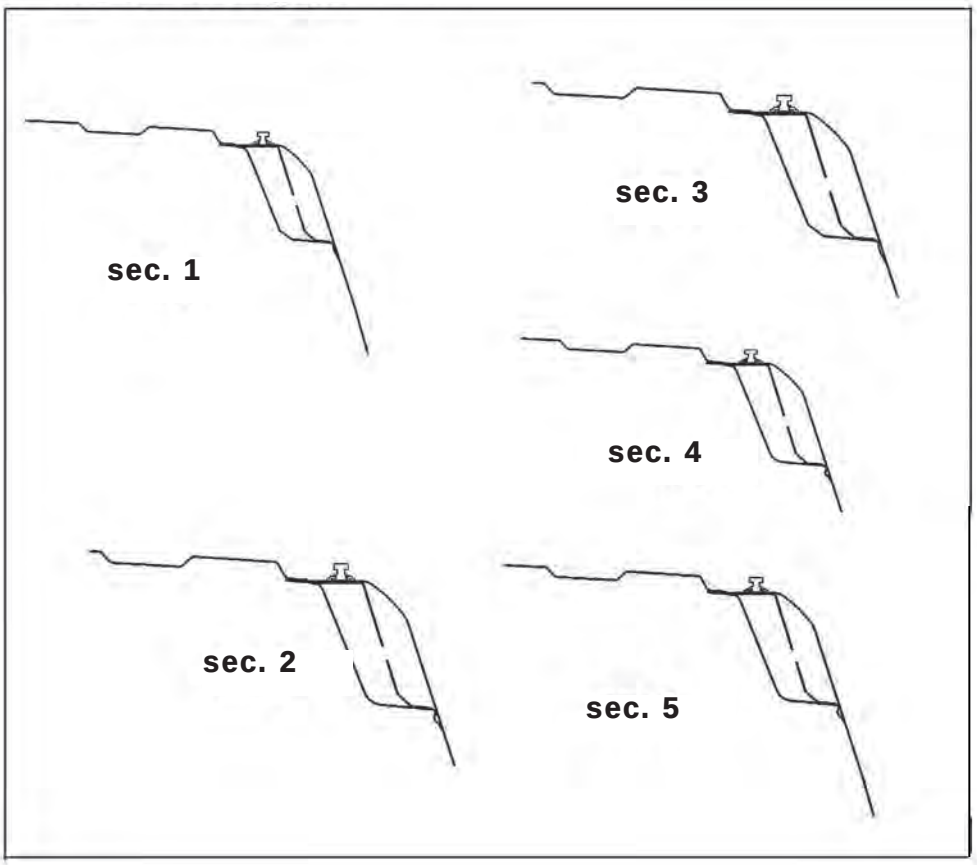
MH2 – LH2 van sections



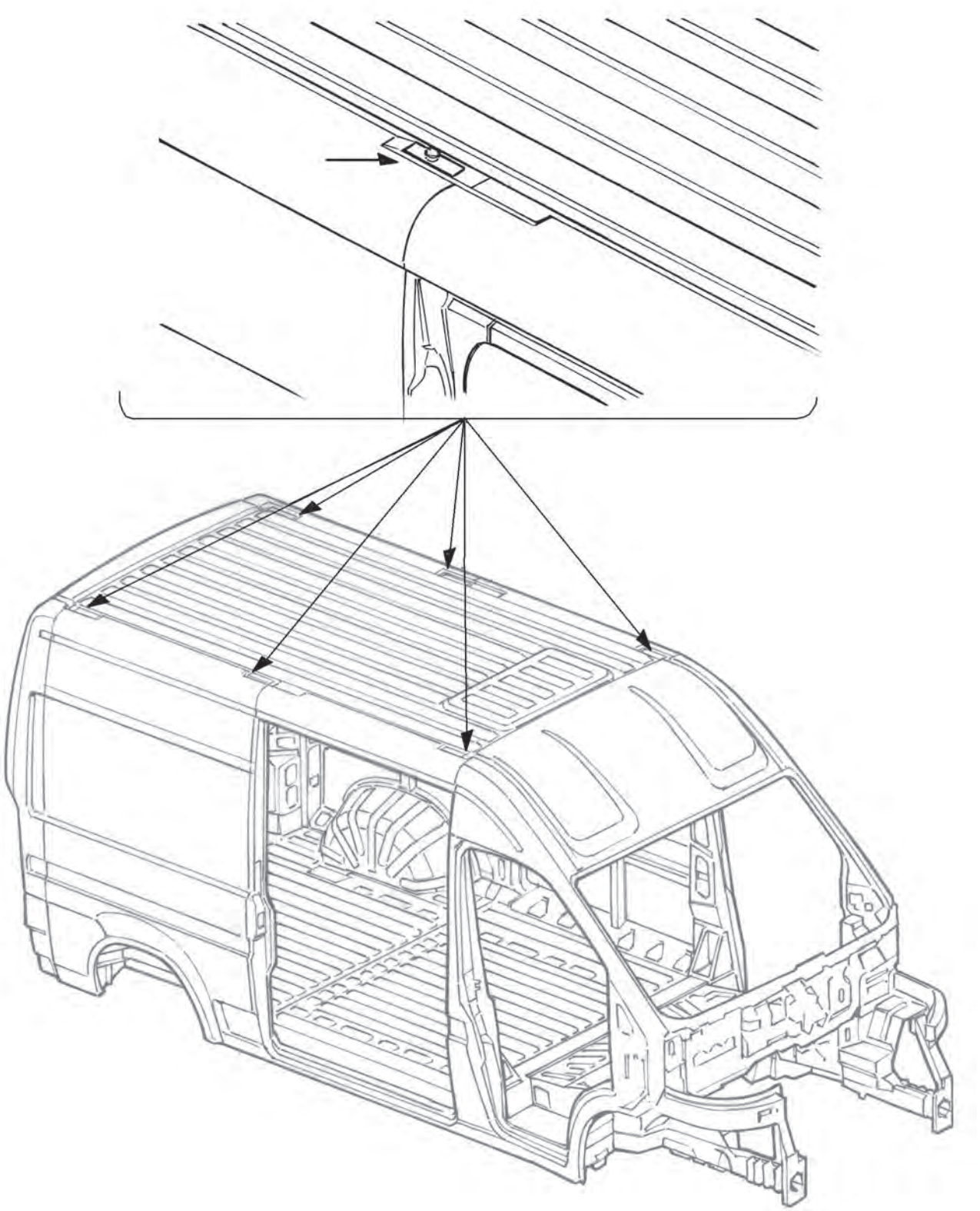
Roof rack attachment point sections



XLH3 – LH3 van sections



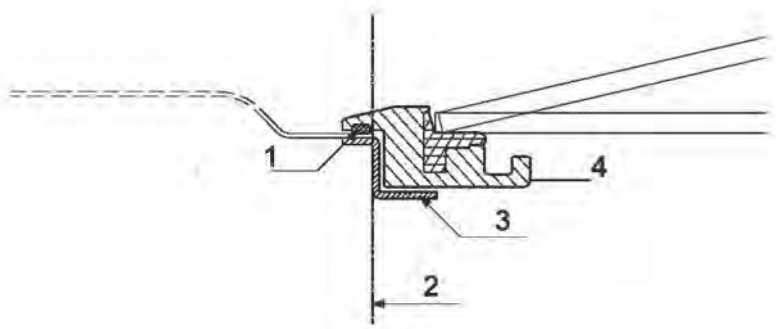
Attachment positioning



Opening a hatch in the roof

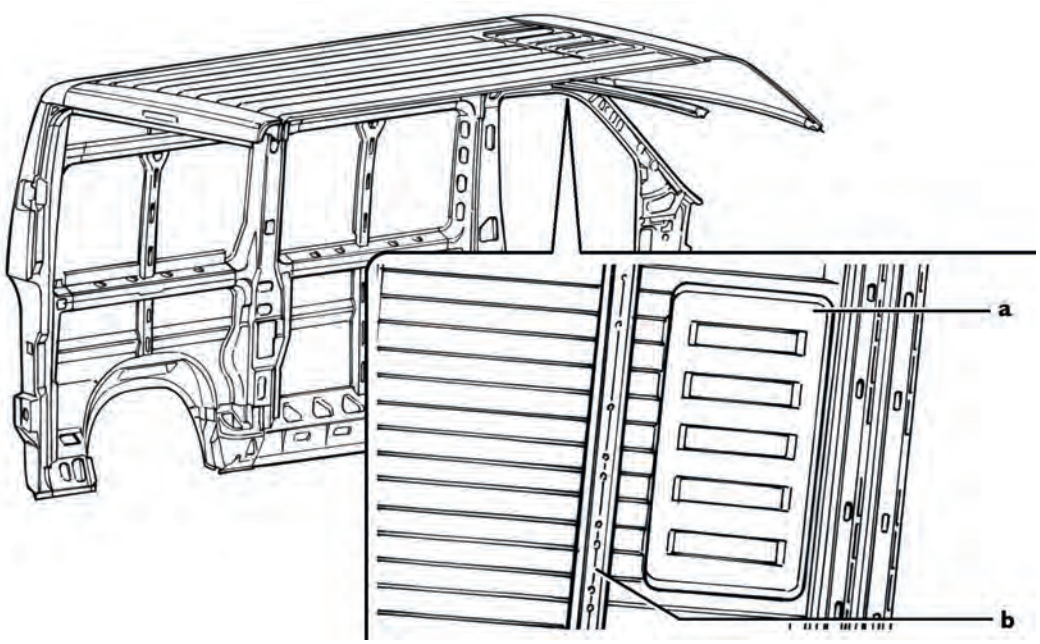
A hatch may be opened in the roof, providing that the works do not involve the ribs and the ensure seal and strength of the modified part.

The figure shows an installation example.



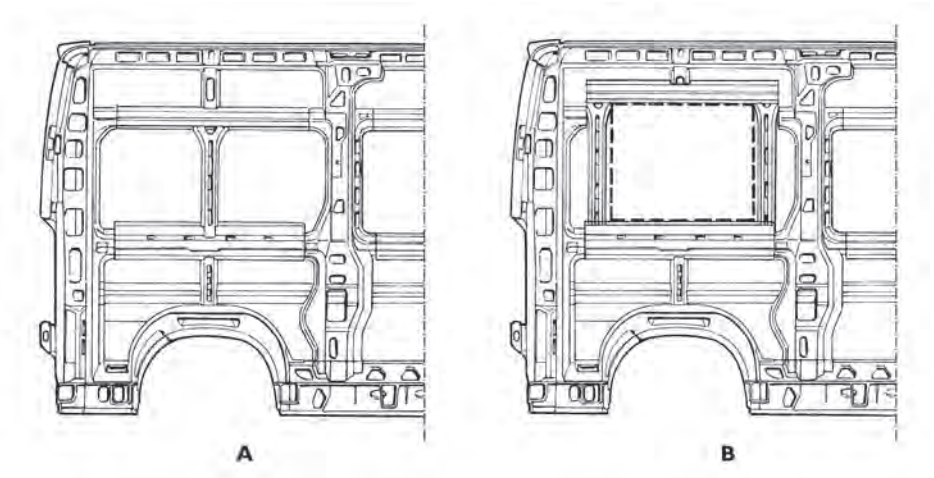
1: Sealant - 2: Cut area - 3: Attachment profile - 4. hatch

NOTE: If the hatch has to be opened in a different area of the roof to (a), cutting of the structural ribs (b) is not permitted. The structure must in all cases be restored to its original conditions of function and rigidity.



Making a window in the side

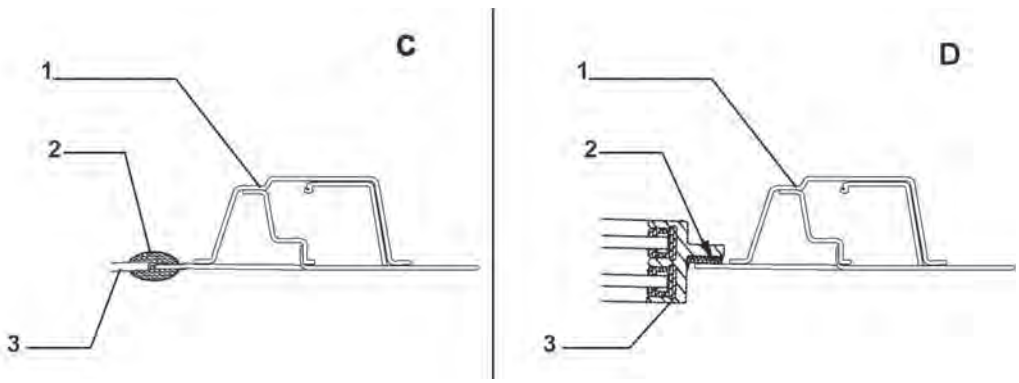
It is permitted to make one or more side windows, provided that they are not on the structural pillars. If it is necessary to make the window at the structure, the opening must comprise a perimetral frame that is connected to the original pillars and longitudinal members (see solution B) in order to restore the structural rigidity of the bodyshell.



A: Original solution; B: solution with added peripheral frame.

Make the cut as shown in the diagram, taking care to maintain a perimeter profile with minimum width of:

- 15 mm for windows fitted with rubber seal (fig. C);
- 20 or 25 mm for bonded windows (fig. D);



1. pillar
2. seal
3. glass.

1. pillar
2. bonding material
3. glass.

NOTE: Before cutting or welding, it is necessary to protect the original body work not involved in the conversion with sheets or adequate protective masks in order to prevent damage resulting from the rework activities.

Heater installation

If a supplementary heater is required, it is advisable to use only the types foreseen by FIAT CHRYSLER AUTOMOBILES S.p.A.
For vehicles on which FIAT CHRYSLER AUTOMOBILES S.p.A. has not foreseen supplementary heaters, these must be installed according to the heater Manufacturer's instructions (i.e. boiler, piping, electrical system arrangement etc.) and as per the instructions given below.
All pertinent national regulations must be respected (i.e. testing, special versions for hazardous goods transport, etc.). The supplementary heater must not use vehicle systems subject to homologation, if their use may negatively alter performance.

In addition:
- the correct function of vehicle components and systems must be safeguarded (i.e. engine cooling);

- for the electrical system, check that battery capacity and alternator power are sufficient for the increased power absorption (see ELECTRICAL SYS. SECTION). Fit the new circuit with a fuse;

- for fuel supply, connect the supply system to an auxiliary fuel tank connected to the return pipe from the engine. Direct connection to the engine fuel tank is only permitted if this is independent to the engine supply lines and the new circuit has a hermetic seal;

- define the routes of pipes and electrical cables, arrangement of brackets and flexible joints, taking into account their dimensions and the affect of heat from the various components on the chassis. Avoid passages and arrangements with exposure that could present a hazard when travelling, adopting covers or guards wherever necessary;

- for water heaters, when the original vehicle heater and engine cooling circuits are involved, in order to obtain correct system function and ensure the original safety level:
  - define the connection points between the supplementary system and the original with special attention, if necessary in agreement with FIAT CHRYSLER AUTOMOBILES S.p.A.;
  - arrange piping rationally, avoiding kinks and siphon sections;
  - apply breather valves to ensure correct system filling;
  - ensure the possibility of complete system drain, fitting any additional plugs required;
  - adopt, where necessary, adequate protection to limit heat loss.

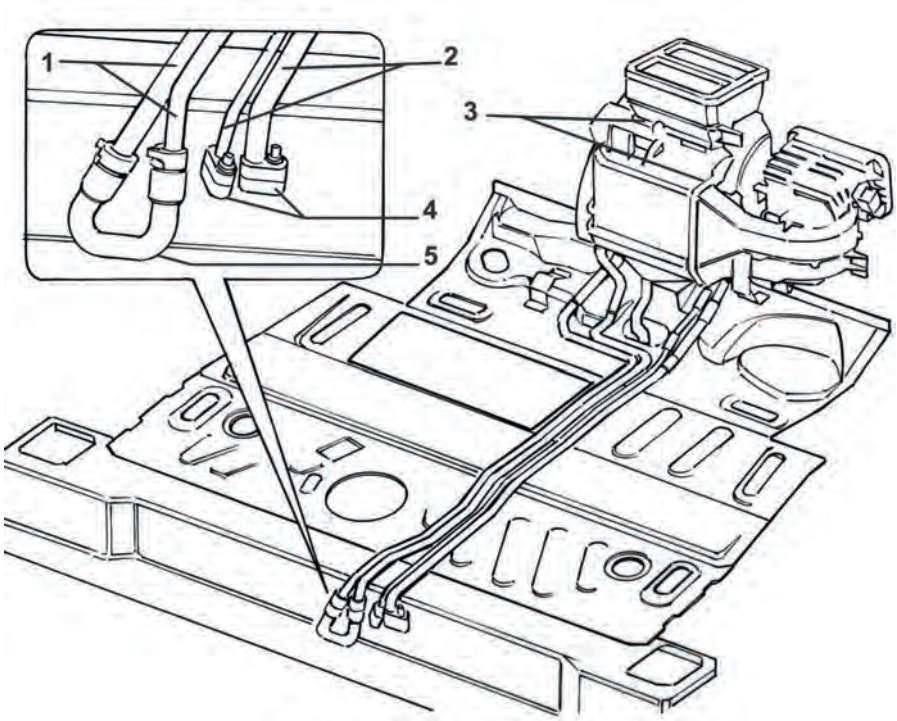
- In air heaters and in cases in which the heater is installed directly in the cabin, special attention must be given to the flu (to prevent combustion gases accumulating in the interior) and the correct distribution of hot air, to avoid direct flows;

- The entire system must be installed to permit good accessibility and ensure rapid maintenance.

Supplementary heater/air-conditioner system pre-fittings

All 'free time' versions can fit air-conditioner and heaters with connections for a supplementary conditioner/heater group.
These pre-fittings obviously concern the rear of the passenger compartment.
As can been seen in the diagram below, the fitting has been realised by means of an extension to the attachments on the cab air-conditioning group.
If a new group is required, it is advisable to use components with similar technical specifications to the existing ones.

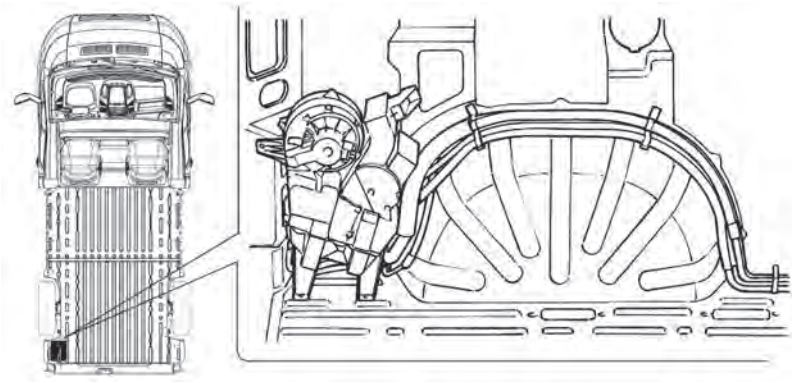
Diagram



1: engine coolant delivery and return pipes;
2: coolant fluid delivery and return pipes;
3: cab air-conditioner;
4: freon pipe connections;
5: heating fluid pipe connection.

NOTE: Refer to the Use and Maintenance Handbook for the technical specifications of liquids/freon.

Supplementary system



The drawing shows one possible location for the supplementary group.

Technical specifications

Model X2/50	Weight (Kg.)	Air flow-rate (Stdm³/h - VENT max cold)	Max.power absorption (A. @12V - VENT max cold)
Main heater group	7.00	420	19
Manual conditioner group	8.50	420	24
Automatic conditioner group	9.50	420	24
Auxiliary heater (under seat)	2.40	210	2,5
Supplementary rear heater group	4.90	380	21

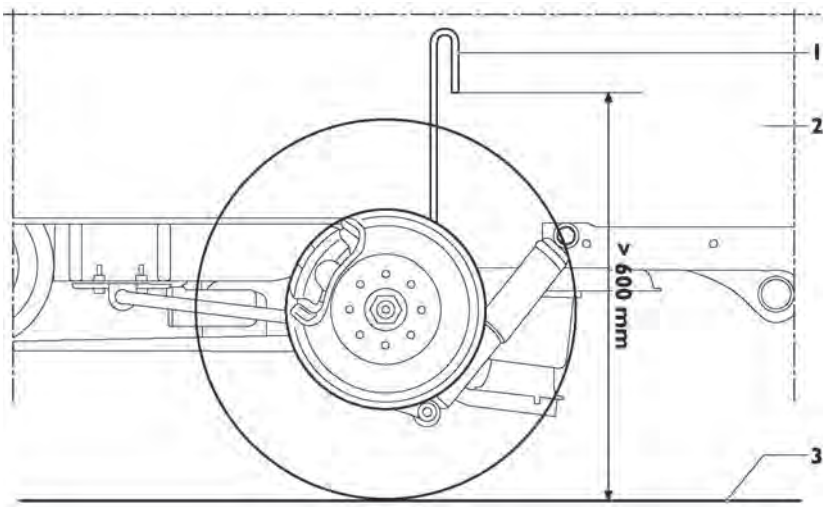
Air flow rate (Stdm³/h)	Engine coolant flow rate (l/h)	Thermal power (BTU/h)	Installed mass thermal power (kW)
Main group radiant mass thermal power			
400	800	37.700	11,00
	500	35.500	10,40
Under seat group radiating mass thermal power			
210	1000	16.400	4,81
Supplementary rear group radiant mass thermal power			
400	800	37.700	11,00
	500	35.500	10,40

Air flow rate (Stdm³/h)	Thermal power (BTU/h)	Evaporator thermal power installed (kW)
Main group evaporator thermal power		
400	22.300	6,50
Auxiliary rear group evaporator thermal power		
350	17.000	5,00

AIR SUSPENSION
Installation of air intake on special chassis-cabs and chassis-cowls with flatbed

NOTICE! install the air intake in a zone shielded from dust and not exposed to direct water jets.

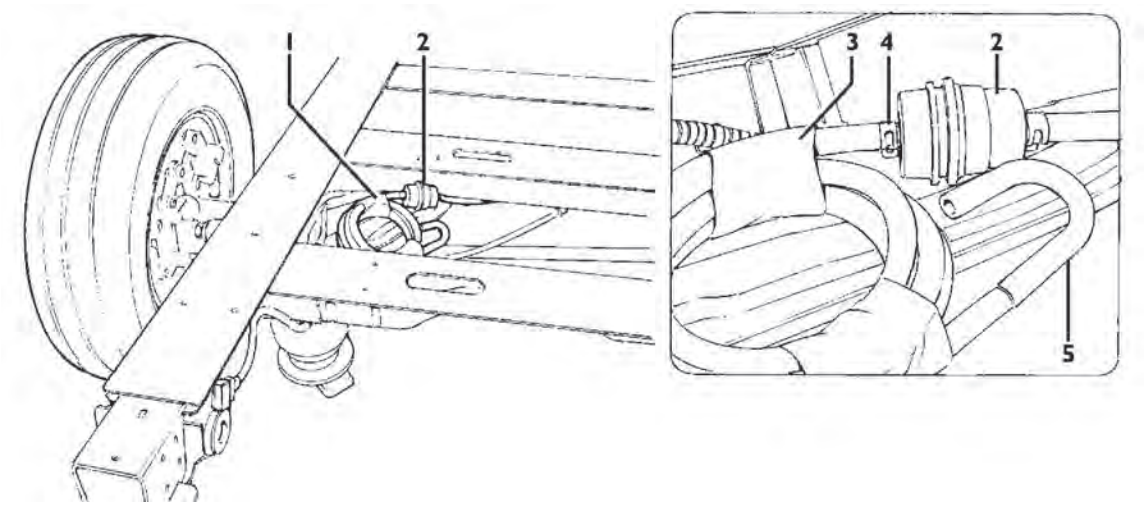
NOTICE! install the air intake opening at a distance from the ground of at least 600mm



1: Air intake; 2: Motorhome cab; 3: Ground line

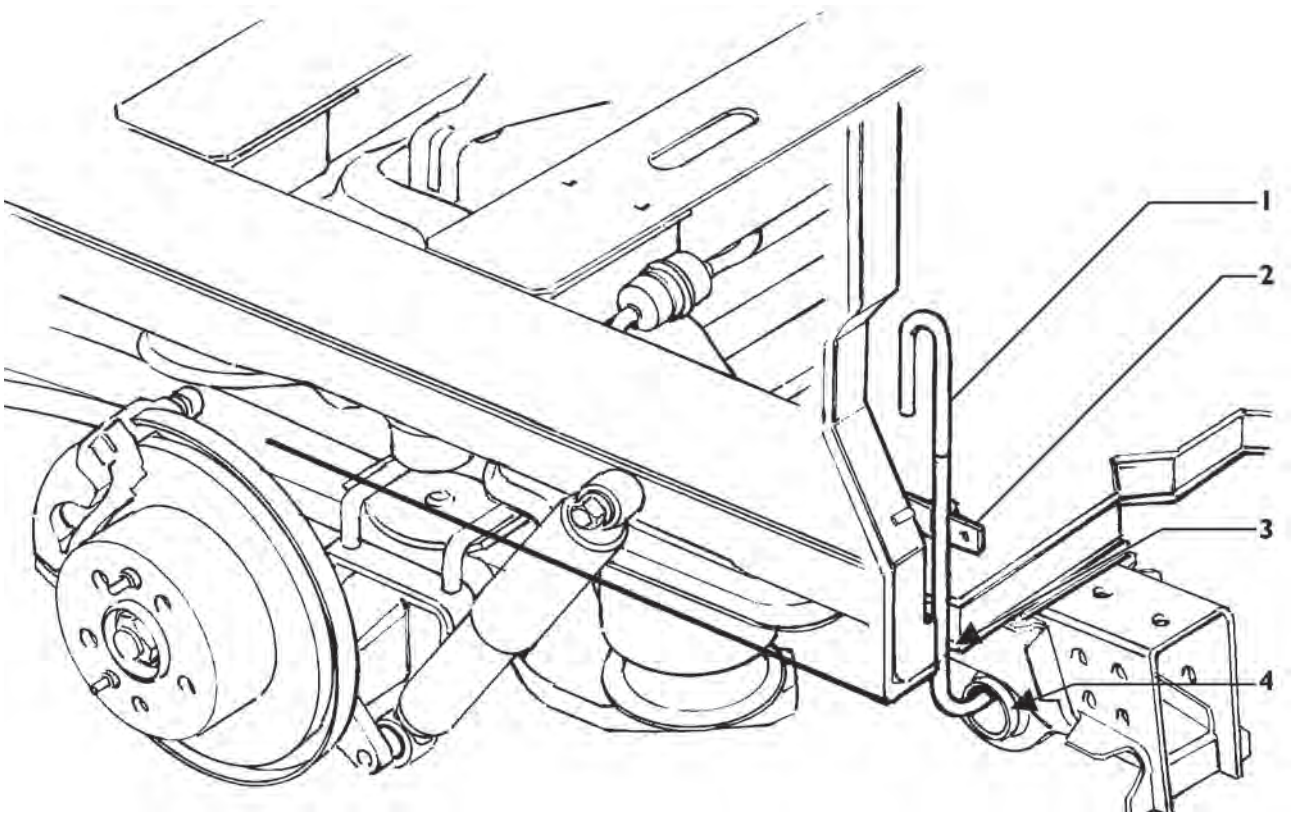
Location and preparation for installation

The pipe, complete with filter (2) and air intake (5), is situated above the rear air suspension cross-member and is held together and restrained by clamps or tape (3). Release the pipe (1) from the clamps or tape (3). To facilitate the installation, separate the filter from the pipe working from the opening collar (4).



1: Pipe; 2: Air filter; 3: Packaging tape; 4: Opening collar;
5: Reversed-U-shaped air intake.

Installation



In the figures below you will find the indications on how to fit the rubber pipe.

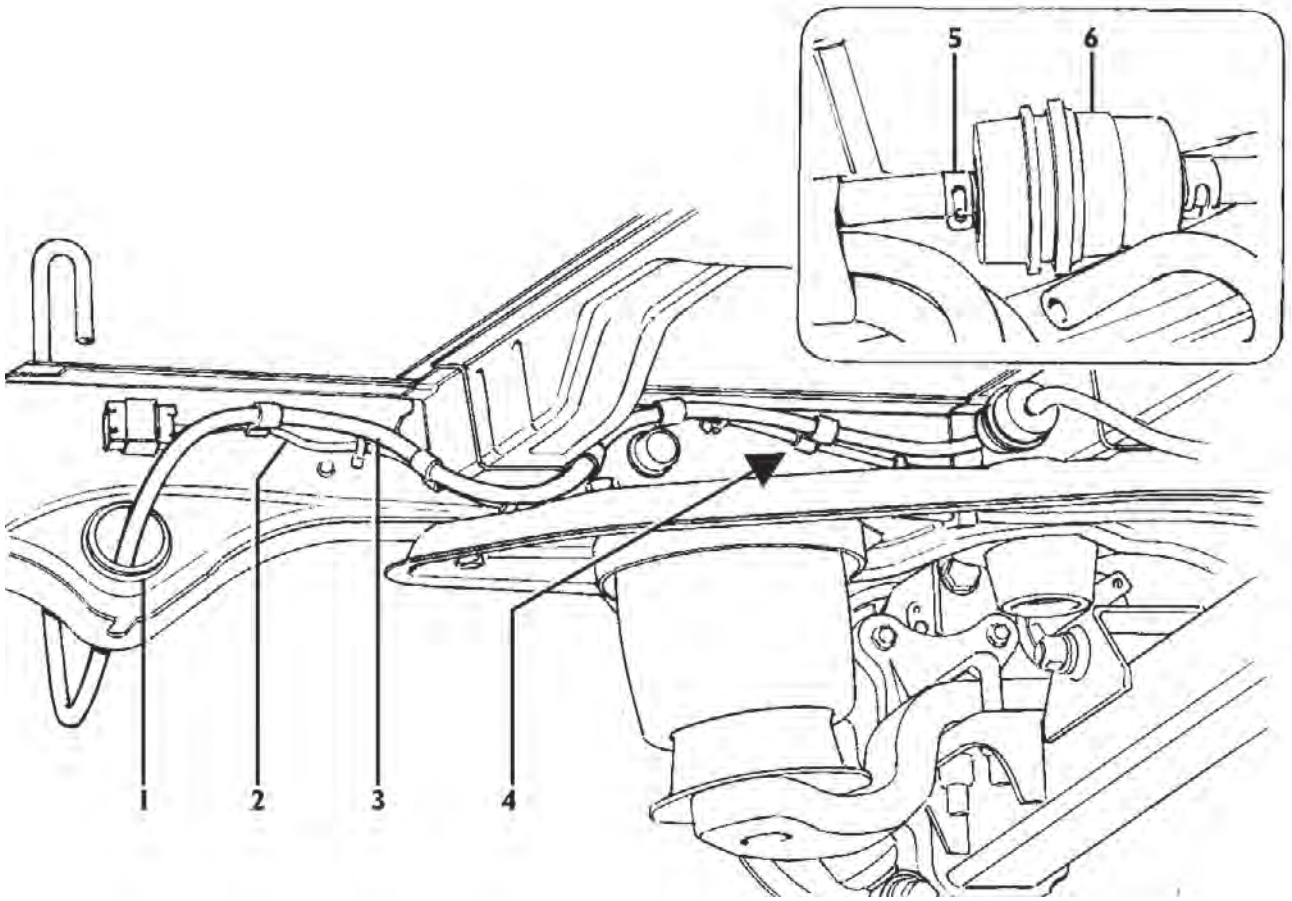
Drill a hole (3), of appropriate size for the passage of the rubber pipe, in the cab floor in the proximity of the left side wall and the rear suspension, as shown in the figure.

Introduce the reversed-U-shaped part (1) through the hole (3). Anchor it to the inner side of the left wall by means of a small bracket (2) and the relative fasteners.

Extend the pipe towards the inner part of the frame through the hole (4) in the longitudinal, which is not used due to the absence of the rear bushing for the connection of the mechanical suspension.

NOTICE! To ensure a sufficient flow of air to the compressor, do not perforate the pipe and do reduce its cross-sectional area; the flow of intake air to the compressor must be in accordance with the specifications.

- It is important that the end part of the pipe (1) retains the reversed U shape in order to prevent the penetration of dust and water. The air intake (1) anchoring point must be positioned at a sufficient distance from the ground, at least 600mm, in a dried, shielded area.



Run the pipe (3) along the left longitudinal. To fasten the rubber pipe to the corrugated sleeve of the electrical system (2) we suggest using commercially available polyamide clamps with double ring or strip (4). If you use fasteners of a different type, make sure that the cross-section of the pipe is not altered.

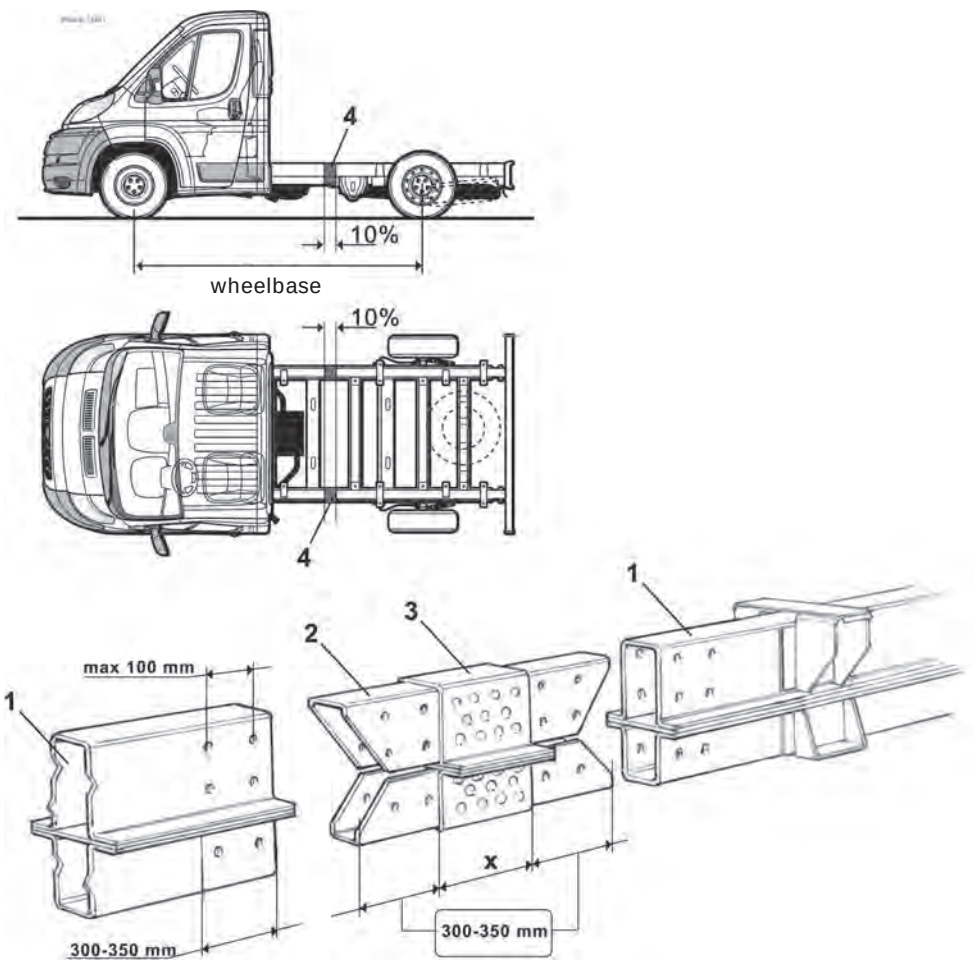
NOTICE:
The flow of air through the pipe must remain the same as it was before the application of the fasteners. A narrower section or a hole, no matter how small, might undermine system operation.

Make sure there are no loose portions of the pipe and complete the installation as necessary by anchoring to the floor the portions of the pipe not fastened to the corrugated sleeve (2), using small brackets or similar fasteners.

The pipe is ca 2000mm long and is longer than necessary. To shorten it, cut the excess portion on the side of the air filter (6). Then restore the connection between the pipe and the filter and fit back the opening collar (5).

Changes to the wheelbase

It is not advisable to change the vehicle wheelbase. You should always address any problem by making use of the wheelbase lengths specified by FIAT CHRYSLER AUTOMOBILES S.p.A.
The versions on which it is possible to make the change in question are chassis-cabs and chassis-cowls without option 555 (air suspension).
It is absolutely prohibited to make this change to: all the vans, the chassis-cabs and chassis-cowls with flatbed, and all the vehicles with 4035 mm and 4300 mm wheelbase.
If you have to change the wheelbase, the length added must never exceed 10% of the original wheelbase for vehicles with ABS and 5% for vehicles with ESC and, in any event, the final length must never exceed 4300 mm.
The figure shows a method for the lengthening of the wheelbase. For the materials of the added portions (parts 2 and 3 in the figure), see the characteristics of the original longitudinal. The quantity and the positions of the connections or welds given in the figure are only indicative. The change must always ensure appropriate bending and torsional stiffness of the structure.

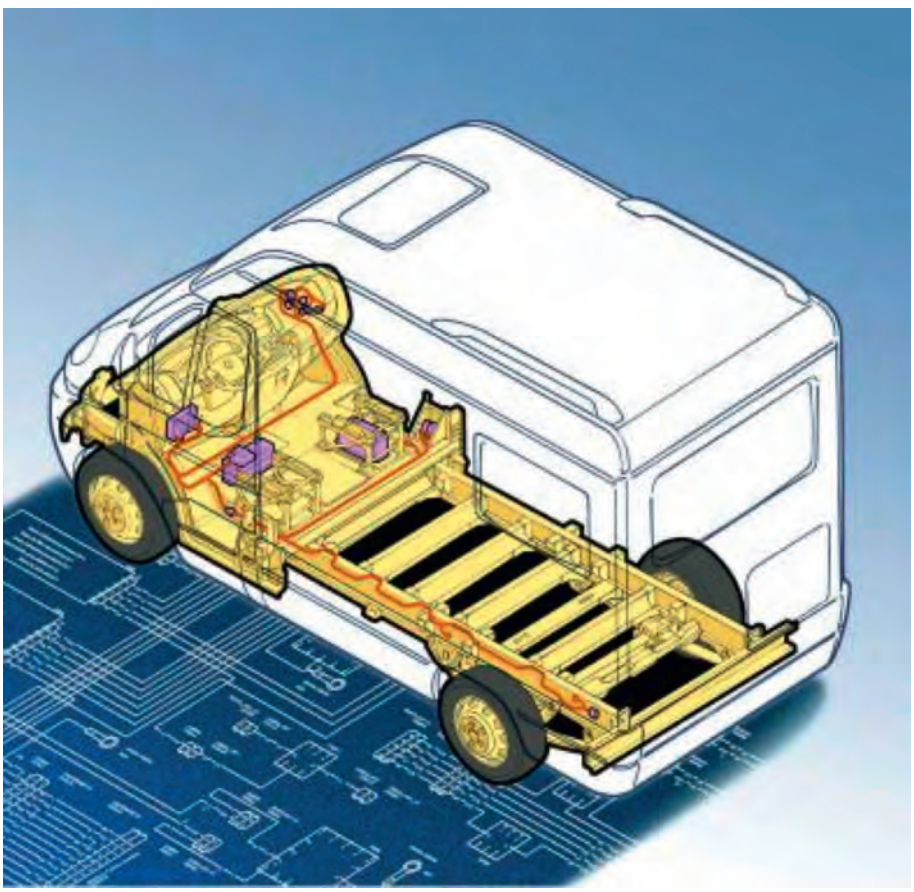


1: Original frame; 2: Reinforcing boxed section; 3: Additional frame;
4: Cutting zone for wheelbase modification;
x: wheelbase lengthening variable dimension
(max. 10% of original wheelbase length for vehicles with ABS, 5% with ESC).

ESC system – Electronic Stability Control

ESC system was developed considering the weight of a completely upfitted vehicle in the respect of the limits indicated in this manual.
When and only if the vehicles does respect the limits indicated at pag. 2.5 for weight distribution and positioning of the centre-of-mass, the full ESC system functionality is ensured, without needing further testing.

ELECTRICAL SYSTEM



1. DESCRIPTIVE KEY 3.4
1.1 List of acronyms in diagrams 3.4
1.2 Key to terminology 3.4
1.3 Cable colour table 3.5
2. OVERVIEW 3.6
2.1 Moving supplementary group and equipment components and attachments 3.7
3. SPECIFICATIONS FOR COACH BUILDERS 3.7
3.1 Connectors provided for conversions 3.7
3.2 Auxiliary alternators and batteries 3.8
3.3 Batteries 3.10
3.4 Fuse and relay box under dashboard 3.12
3.5 Fuse box on battery 3.13
3.6 Right pillar fuse and relay box 3.14
3.7 Ground points 3.14
4. CONNECTORS PROVIDED 3.15
4.1 Connector C036 L1A (15-way) – Coach-builder's socket 3.15
4.2 Connector C036L1B (6-way) – Coach-builder's socket 3.22
4.3 Connector C036L1C (2-way) – Coach-builder's socket 3.25
4.4 Connector Y203L4A (12-way) – Rear lights 3.27
5. FRONT DOOR AND AERIAL CONNECTORS 3.28
5.1 Connector Y001LA (24-way) – Driver's side door 3.29
5.2 Connector Y002LA (24-way) – Passenger side door 3.33
5.3 Connector Y121LA (4-way) – Driver's side door (opt) 3.36
5.4 Connector Y116LA (4-way) – Passenger side door (opt) 3.39
5.5 Procedure for setting radio switching off time after key-off 3.40
5.6 Vehicles provided with "5BH" - Steering wheel controls for outfitters 3.41
5.7 Connector Y050PA (1-way) – AM/FM radio aerial 3.42
5.8 Phantom-box – Amplified radio aerial power supply 3.46
5.9 Headlight Alignment Corrector 3.46
6. GENUINE NEW DUCATO COMPONENTS 3.47
6.1 Locks 3.47
6.2 Front lights 3.48
6.3 Fog lights 3.49
6.4 Rear lights 3.50
6.5 Taillights 3.51
6.6 Windscreen wiper 3.53
6.7 Windscreen washer pump 3.55
6.8 Left hand external rear view mirror 3.56

6.9 Right hand external rear-view mirror 3.57
6.10 Ceiling light 3.59
6.11 Driver's side door control pad 3.60
6.12 Passenger side door control pad 3.61
6.13 Electric windows 3.62
7. STANDARD FIAT CHRYSLER AUTOMOBILES S.P.A. COMPONENT DRAWINGS 3.63
7.1 20A micro relay switch 3.63
7.2 30A micro relay switch 3.64
7.3 50A maxi relay switch 3.65
8. TIPS FOR INSTALLATION 3.66
8.1 Refrigerator power supply 3.66
8.2 Coachbuilders socket in engine bay 3.66
8.3 Anti-theft system 3.72
8.4 Trailer 3.72
8.5 Robotised gearbox 3.73
8.6 Truck Upfitter Module 3.74
8.7 TPMS 3.90
8.8 LDWS 3.94

Descriptive key

List of acronyms in diagrams

ACM	Automatic Climate Module
AHCU	Additional Heater Control Unit
ASM	Air Suspension Module
ASS	Auxiliary Stack Switches
ASU	Alarm Siren Unit
BCM	Body Computer Module
BSM	Brake System Module
CDC	Co-Driver Door Command
CSM	Column Switch Module
CSS	Central Stack Switches
CTCU	Chrono Tachograph Control Unit
CTM	Convergence Telematic Module
DDC	Driver Door Command
DSHS	Driver Seat Heater System
ECM	Engine Control Module
FCLU	Front Ceiling Light Unit
GPCU	Glow Plug Control Unit
IBS	Intelligent Battery Sensor
IPC	Instrument Panel Cluster
LDWS	Lane Departure Warning System
LSS	Left Stack Switches
MCD	Manual Climate Device
MTA	Manual Transmission Automated
PAM	Parking Aid Module
PSHS	Passenger Seat Heater System
RLS	Rain Light Sensor
RMCD	Rear Manual Climate Device
RRM	Radio Receiver Module
SAS	Steering Angle Sensor
SDM	Sensing and Diagnostic Module
SLU	Shift Lever Unit
SSCU	Servo Steering Control Unit
SWC	Steering Wheel Command
TPMS	Tire Pressure Monitoring System
TUM	Truck Upfitter Module
VPAS	Video Parking Aid System
VSU	Voltage Stabilizer Unit

Key to terminology:

+30: permanent +12V vehicle power supply

+KEY: signal active at +12V vehicle when ignition switch is in position (MAR)

+LIGHTS: signal active at +12V when position lights are on.

BATT. AUX: auxiliary battery installed by coach-builder.

P.M. connector: connector suitable for receiving male terminals

P.F. connector: connector suitable for receiving female terminals

1.3 Cable colour table

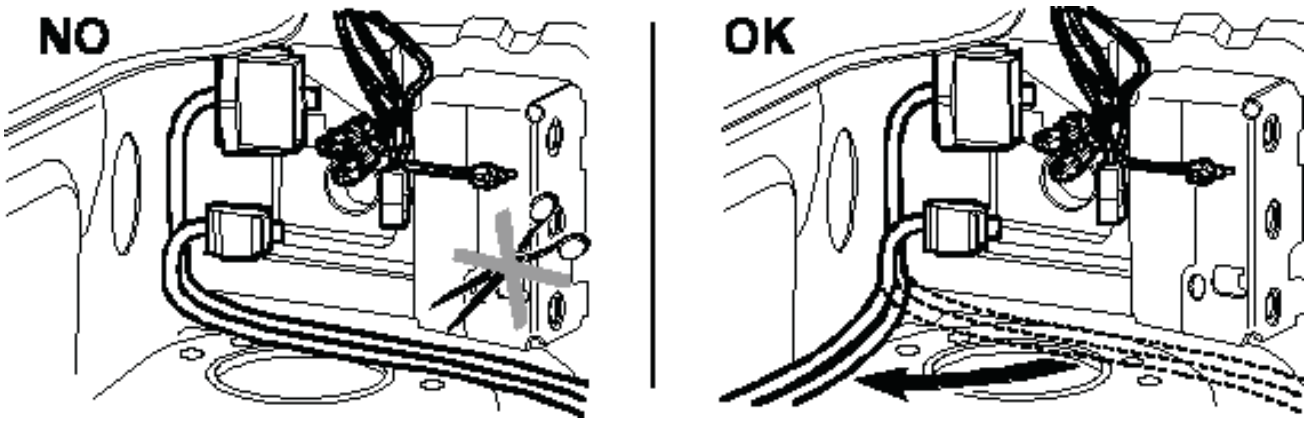
Code	Colour
A	Light blue
B	White
C	Orange
G	Yellow
H	Grey
L	Blue
M	Brown
N	Black
R	Red
S	Pink
V	Green
Z	Purple
W	Light brown

Overview

Moving supplementary group and equipment components and attachments

If to apply equipment and realise various types of transformation it is necessary to move any existing groups (misc. components, fuel tank, spare wheel, etc.), this is permitted provided that the function of the same is maintained and the original type of connection is maintained, and that their position is not substantially altered in a crosswise direction on the chassis, if heavy.
If an object has to be installed on the route of a cable of the original electrical system, the route may be altered provided that the cable is not cut and the same fixation system is used.

Figure 1

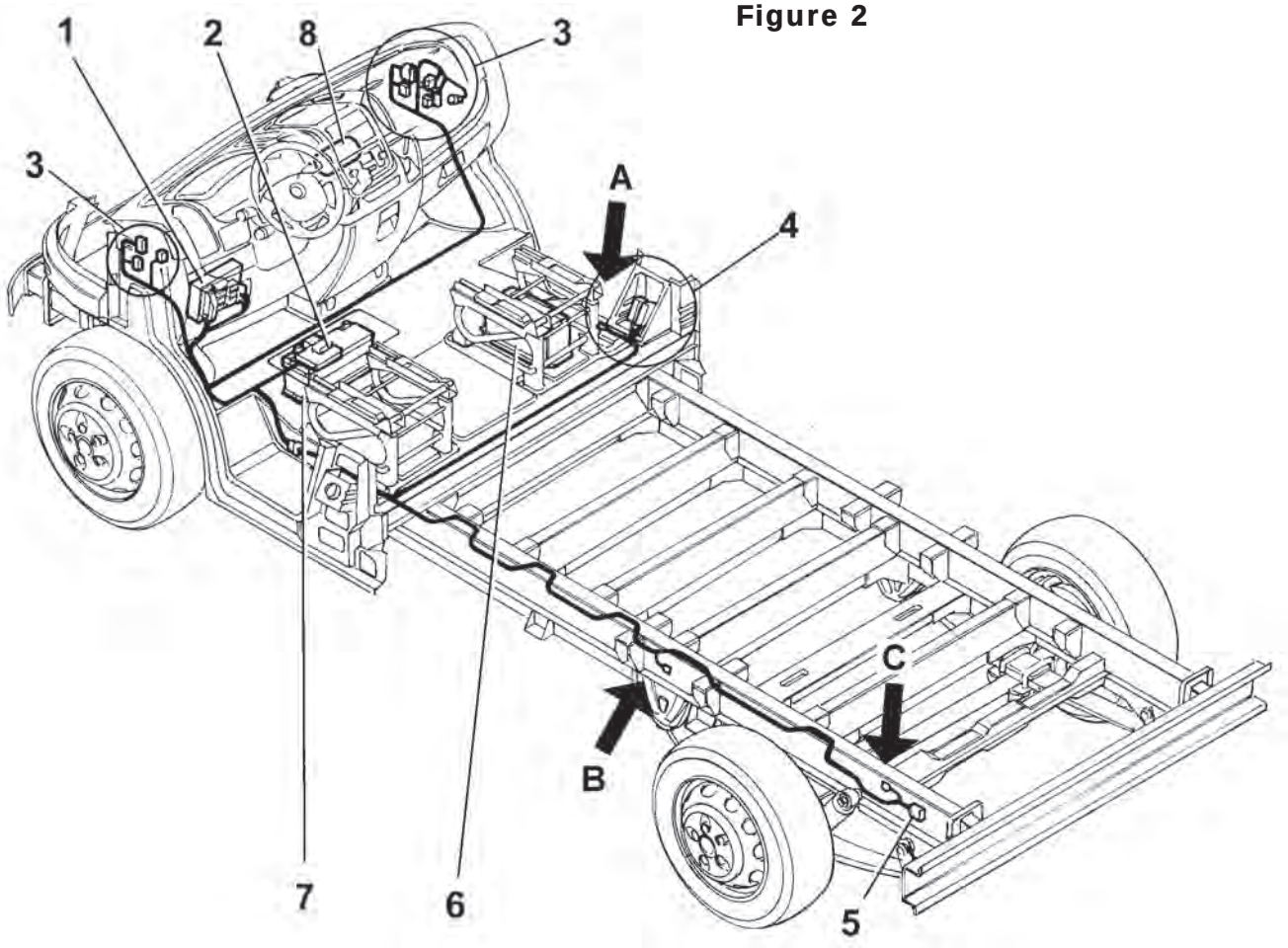


Specifications for coach builders

1.5 Connectors provided for conversions

For the coach-builders to effectively and correctly use the basic system on the NEW DUCATO model, FIAT CHRYSLER AUTOMOBILES S.p.A. has provided specific connection points to which supplementary systems can be connected.
This type of provision is necessary to prevent any kind of tampering or manipulation of the basic design, and to ensure function integrity and validity of the vehicle warranty.
In addition to the main interconnection points foreseen for connection to supplementary systems, this section illustrates and describes a number of other subjects (dashboard control unit, battery, etc.) that are the exclusive domain of the basic system, and as such must not be altered in any way by the persons responsible for the conversion.

Figure 2



1. Dashboard fuse control unit – 2. Battery fuse box – 3. Connector group for doors and aerials – 4. Side fuse/relay box with 16, 15 and 2-way connectors for coach-builder interfaces – 5. Rear services connector – 6. Possible location of auxiliary battery
7. Main system battery – 8. Alternator – A. B. C. ground points

Auxiliary alternators and batteries

The installation of high power absorption electrical equipment (i.e. frequently used electric motors, or electric motors used less frequently but for long periods without the support of the engine, such as loading platforms for city use), or a large number of supplementary electrical utilities, could demand power levels that the normal vehicle system is not capable of supplying. In these cases supplementary batteries of suitable capacity must be installed.
The vehicle system is sized to supply the power requirements of standard equipment, all of which is provided with specific protection and connected with suitably sized cables. Applications of supplementary equipment must also foresee adequate protection and must not overload the vehicle system.
If higher capacity batteries are installed, due to the higher current draw, make certain that a suitably oversized alternator is also installed. In no case should the increase in battery exceed 20% of the standard battery capacity, to prevent damage to any component of the system.
If it is necessary to make alterations to the system other than the ones described in this manual (for example, additional batteries in parallel), the works must be co-ordinated with FIAT CHRYSLER AUTOMOBILES S.p.A.

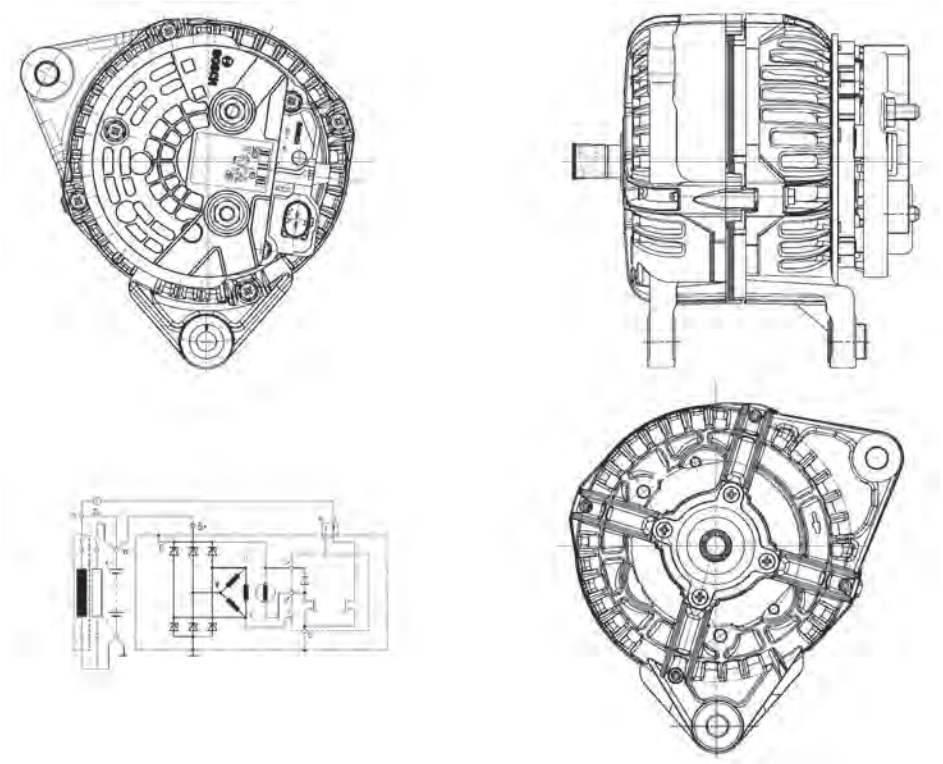
Current take off

For information on current take off points, see the description on the following page.

Available oversized alternator summary table

Engine	Opt	Brand	Model	Size	Regulator	Regulator voltage features
2,0 JTD	065	Denso	SC2	150 A	GL6	Vreg = 14.5 V at 25°C and 6000 rpm Thermal compensation -10 mV/°C
2,3 F1A Euro 4-5	4WP	Valeo	FG18	180 A	YR208	Vreg = 14.55 V at 25°C and 6000 rpm Thermal compensation -10 mV/°C
2,3 F1A Euro 6 LPEGR	7KK	Valeo	FGN20	200 A	YR208	Vreg = 14.55 V at 25°C and 6000 rpm Thermal compensation -10 mV/°C
3,0 F1C-3,0 CNG	4WP	Valeo	FG18	180 A	YR208	Vreg = 14.55 V at 25°C and 6000 rpm Thermal compensation -10 mV/°C

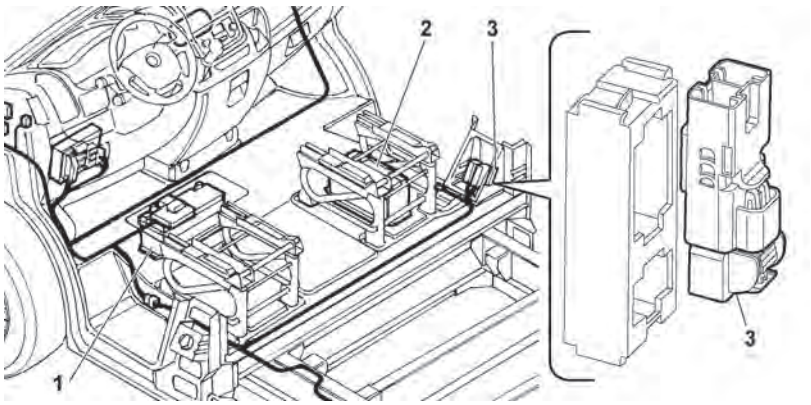
Figure 3



Note: drawings for information only

1.7 Batteries

Figure 4



1. Main battery – 2. Auxiliary battery – 3. Two-way connector
The above drawing (detail 2) shows one possible location for the auxiliary battery.
If the main battery is removed/replaced, check correct function of the gas/liquid drain pipe.

Note: For auxiliary battery installation:

- in the cargo bay;
- in passenger compartment

recombination batteries (AGM or gel) are advised.

Adequate separation must be provided between the battery and the passenger compartment, with a suitable container capable of ensuring seal in case of:

- vapour emissions (for example in case of alternator voltage regulator fault);
- battery explosion;
- to provide a breather toward the compartment exterior.

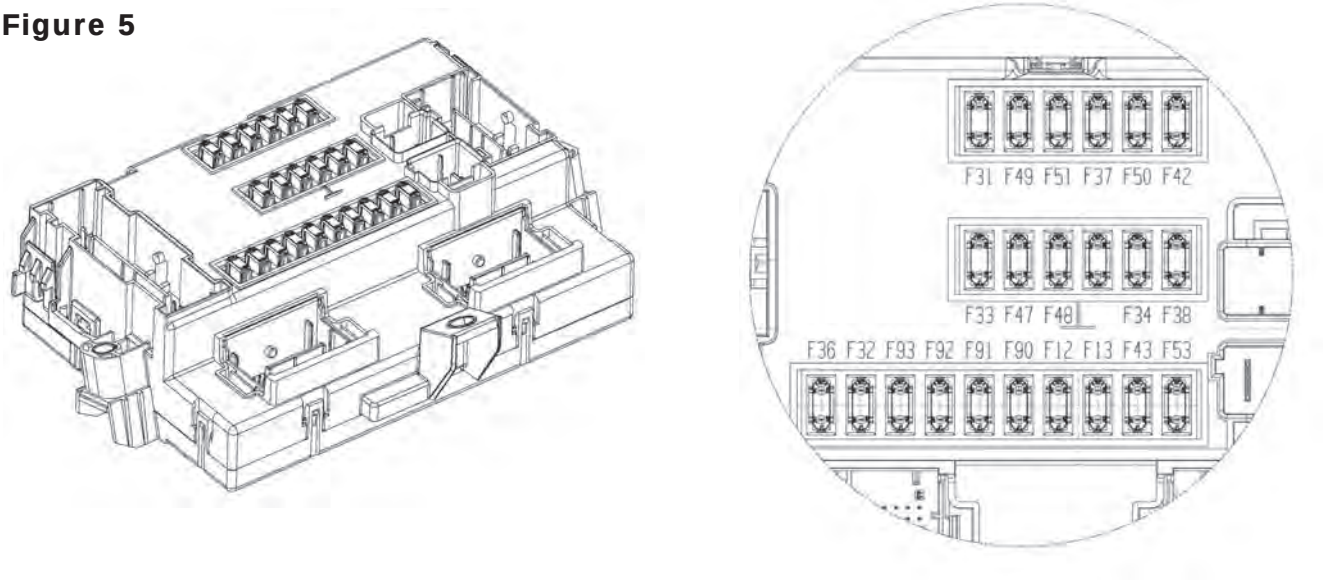
It is also necessary that the gas evacuation system is located as far as possible from any potential sources of spark, and from mechanical/electrical/electronic components, opting for a breather system that prevents vacuum formation in the battery.
There is a two-way connector (3) at the base of the passenger side door, for connecting the auxiliary battery (see Figure 10).

When charging system for the secondary battery are installed, it's also allowed the management of the main battery if compatible with the battery specifications and through a connection properly protected by a fuse.

The auxiliary battery ground connection must be made with an adequately sized cable, as short as possible and using the points provided on the vehicle (see Figure 2).

1.8 Scatola fusibili e relè sottoplancia

Figure 5



Fuse table

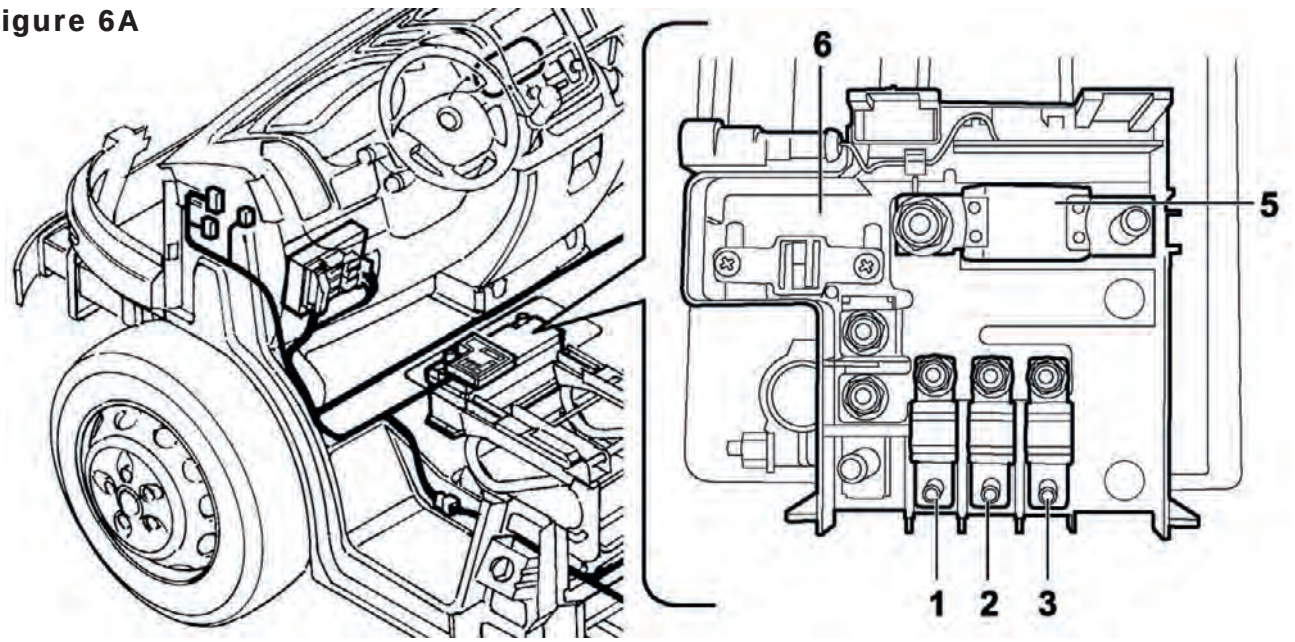
Fuse	Function	Rating
F12	RH DIPPED HEADLIGHT	7,5A
F13	LH DIPPED HEADLIGHT	7,5A
F31	INT/A	5 A
F32	SBMT	7,5 A
F33	START & STOP	7,5 A
F34	MINIBUS	7,5 A
F36	+30 NRR, NCV, CCT, CSA, NCL, WEBASTO TIMER, BATTERY MASTER SWITCH	10 A
F37	INT CLA (NA), NQS	7,5A
F38	DOOR LOCK	20 A
F42	INT NFR, NAS, CLA (NC)	5 A
F43	WINDOW WASHER PUMP	20 A
F47	ELECTRIC WINDOW DRIVER'S SIDE	20 A
F48	ELECTRIC WINDOW PASSENGER'S SIDE	20 A
F49	INT NSP, CAV, RADIO AFTERM. / NCV, STEERING WHEEL CONTROLS, CSS, LSS, CSP, AUX PANEL, 5QD	5 A
F50	INT NAB	7,5 A
F51	INT POWER STEERING ECU, REVERSE, H20 DIESEL FILTER, FLOW METER, NCL, CLUTCH, CCT, NAV. AFTERM.	5 A
F53	+30 NQS	7,5 A
F90	LH MAIN BEAM	7,5 A
F91	RH RIGHT BEAM	7,5 A
F92	LH FOG LIGHT	7,5 A
F93	RH FOG LIGHT	7,5 A

1.9 Fuse box on battery

The vehicle main battery has an interconnection unit which has a socket for an auxiliary battery.
The connection foreseen for coach-builders is the 50A fuse (3).
The cable involved is complete with two-way connector located in the compartment at the base of the passenger side pillar (see Figure 4).

No Minibus vehicle type

Figure 6A



Connections key and description:

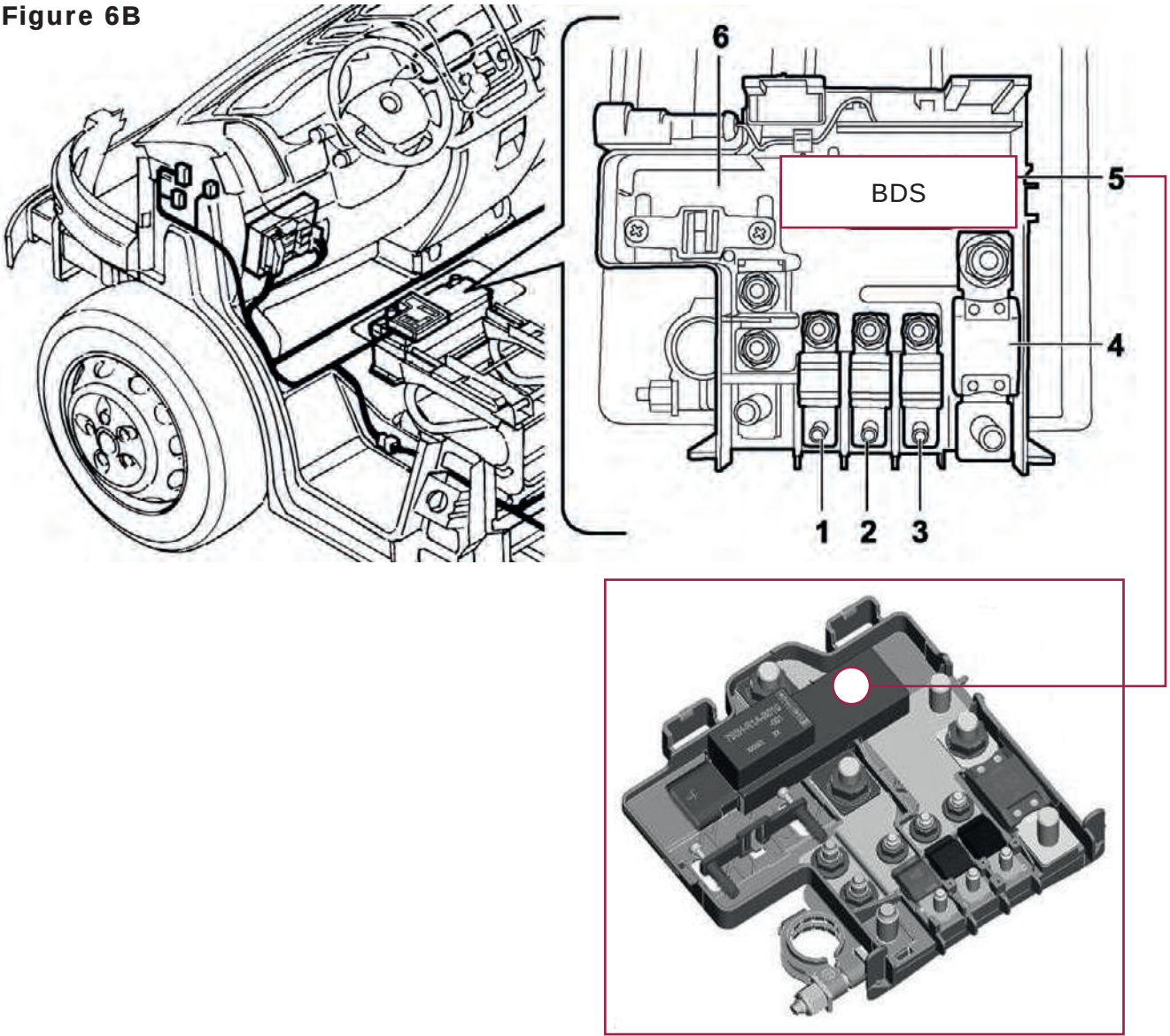
1) auxiliary battery power (50A) via 2-way connector:
2) dashboard fuse and relay box auxiliary power (50 A)
3) main battery under-dashboard fuse and relay box (70 A)

NOTE: install a power relay between the two-way connector and the auxiliary battery positive, so that with the engine off the system added by the coachbuilder is separated from the main vehicle system

5) starter motor and alternator power (MEGA 500);
6) interconnected control unit on battery.

Minibus and CNG vehicle type

Figure 6B



Connections key and description:

1) dashboard fuse and relay box auxiliary power (50 A)
2) main battery under-dashboard fuse and relay box (70 A)
3) auxiliary battery power (50A) via 2-way connector:

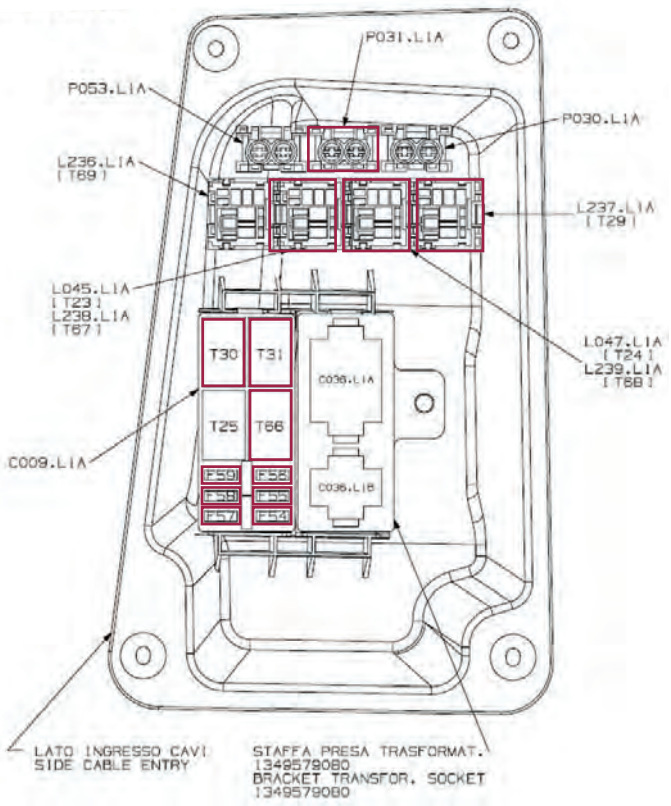
NOTE: install a power relay between the two-way connector and the auxiliary battery positive, so that with the engine off the system added by the coachbuilder is separated from the main vehicle system

4) engine bay fuse and relay box power (150 A);
5) BDS – Battery Distribution System, Emergency Push Button;
6) interconnected control unit on battery.

1.10 Right pillar fuse and relay box

No Minibus, Full OPT vehicle type

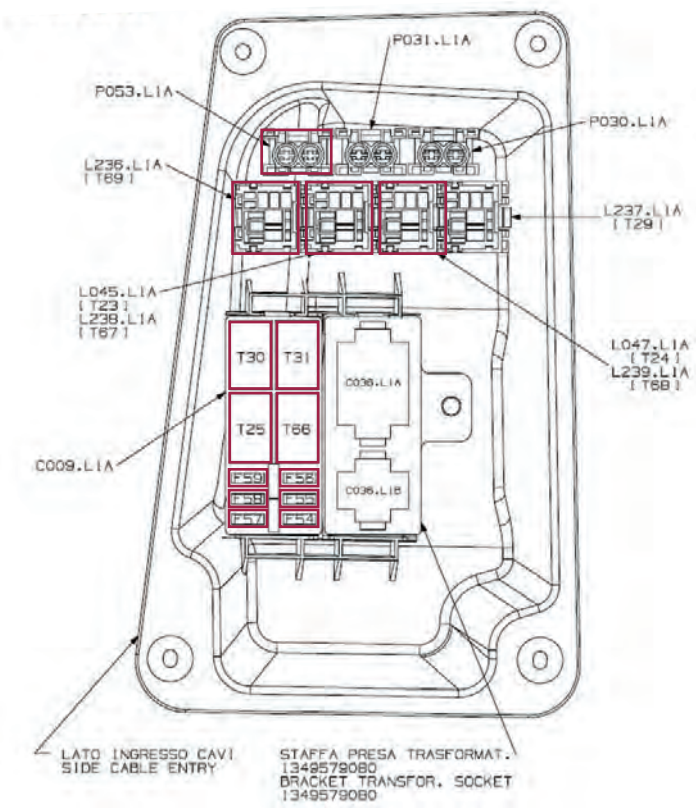
Figure 7A



▭ = Relè e fusibili presenti in configurazione full opt.

Cod.	Relè [micro]	In[A]
T23	Elettroventola riscaldatore supplementare	30
T24	Condizionatore supplementare bassa velocità	30
T29	Abilitazione condizionatore supplementare	30
T30	Lunotto termico	30
T31	Riscaldatore supplementare sottosedile	30
T66	+ Chiave sedili riscaldati	30
Cod.	**Fuse [a0]**	**In[A]**
F54	Ventola aspirazione/ventilazione minibus	15
F55	Sedili riscaldati	15
F56	Presa 12v trasporto persone/ trasformatori	15
F57	Risc. Sottosedile/ elettrovalvola/ enable risc. suppl.	10
F58	Lunotto termico sx	15
F59	Lunotto termico dx	15
Cod.	**Fuse [a]**	**In[A]**
P030	Riscaldatore/condizionatore supplementare	10
P031	Riscaldatore/condizionatore supplementare	30

Figure 7B



▭ = Relè e fusibili presenti in configurazione full opt.

Cod.	Relè [micro]	In[A]
T67	Ventilazione minibus	30
T68	Ventilazione minibus	30
T25	Luci interne minibus	30
Cod.	**Fuse [a0]**	**In[A]**
T69	Sidemarker	30
T30	Lunotto termico	30
T31	Riscaldatore supplementare sottosedile	30
T66	+ Chiave sedili riscaldati	30
Cod.	**Fuse [a]**	**In[A]**
F54	Ventola aspirazione/ventilazione minibus	15
F55	Sedili riscaldati	15
F56	Presa 12v trasporto persone/ trasformatori	15
F57	Risc.Sottosedile/ elettrovalvola/ enable risc. Suppl.	10
F58	Lunotto termico sx	15
F59	Lunotto termico dx	15
Cod.	**Fuse [a]**	**In[A]**
P053	Sidemarker	10

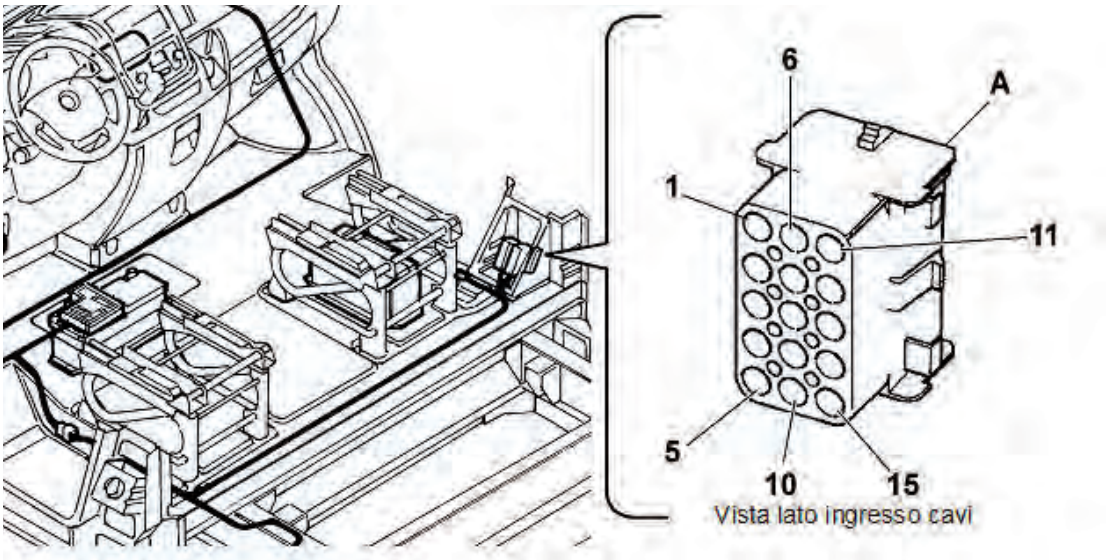
1.11 Ground points

If ground points A, B or C are used, the fastening nut must be tightened to torque of 8 Nm ± 10%.

Connectors provided

Connector C036 L1A (15-way) – Coach-builder's socket
3D view of connector

Figure 8



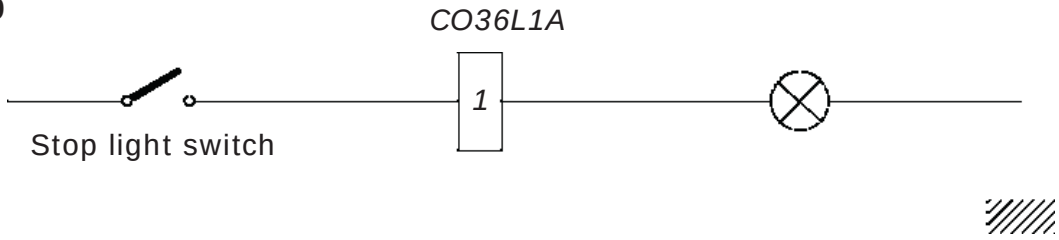
Description of connector functions

Pin	Function/Connector part number	Minimum cable section [mm^2]	cable colour	Notes
	15-way Tyco connector p/n 0-926647-1 Counterpart: Tyco p/n 1-480710-0 (by coach builder)			Reference to diagram C036-L1A
1	Third stop light	0,5	B	PM_{AX}= 21W at 12V (in alternative to the one on Y203L4A)
2	D+ (active at ground)	0,35	MN	I_{MAX}= 300mA (1 Fiat Chrysler Automobiles S.p.A. standard relay coil)
3	Vehicle speed repeater (VSO)	0,35	MV	I_{MAX}= 5mA (see Figure 11)
4	Door lock control	1,5	RN	I_{MAX}= 12A (for actuation times see Table 1)
5	Door unlock control	1,5	NR	I_{MAX}= 12A (for actuation times see Table 1)
6	Side and rear door status signal	0,35	NZ	Use an N.O. to ground switch (minimum clean contact current 10 mA)
7	Driver 20W SBMT#1 timed ceiling light power supply	0,35	RV	Power supply (+) for timed ceiling light, 15' with key-off (PMAX= 20W at 12V)
8	Ceiling light negative control (dimmer)	0,75	BV	Ceiling light control (-) P_{MAX}= 20W at 12V
9	B-CAN Low	0,35	B	Fitting for Fiat Chrysler Automobiles S.p.A. accessory line anti-theft (1)
10	B-CAN High	0,35	L	Fitting for Fiat Chrysler Automobiles S.p.A. accessory line anti-theft (1)
11	Side markers negative control relay	0,5	GR	I_{MAX}= 300 mA (1 Fiat Chrysler Automobiles S.p.A. standard relay coil)
12	A/C request	0,5	GV	Air conditioner on positive signal I_{MAX}= 300 mA (1 Fiat Chrysler Automobiles S.p.A. standard relay coil)
13	Key-on power (+KEY) from F49	0,35	LG	I_{MAX}=600 mA (2 Fiat Chrysler Automobiles S.p.A. standard relay coils)
14	Auxiliary heater positive control	0,35	MV	I_{MAX}= 600 mA (2 Fiat Chrysler Automobiles S.p.A. standard relay coils)
15	Not connected	-	-	-

(1) not for use with other applications

Luce di arresto supplementare (3° stop)

Figure 9



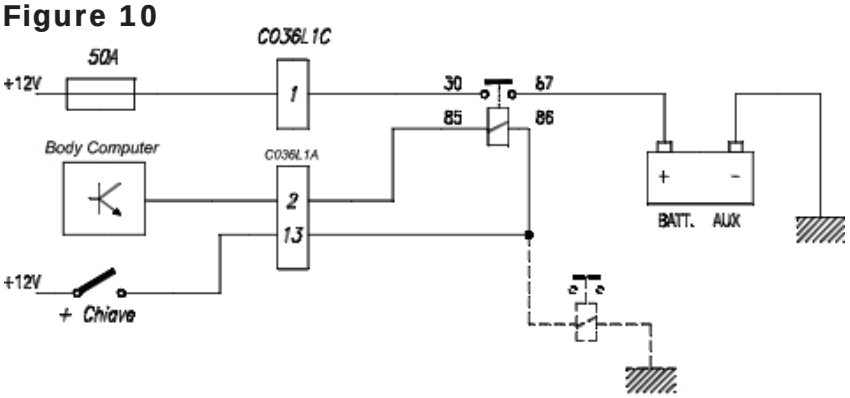
Ground point nearest to component: choice between A, B, C or pin 2 connector C036L1C

Alternatively the third stop light can be connected to connector Y203L4A - pin 8.

ATTENTION: it is forbidden to connect either pin 1 of connector C036L1A, or pin 8 of connector Y203L4A.

Charging in progress signal (D+)

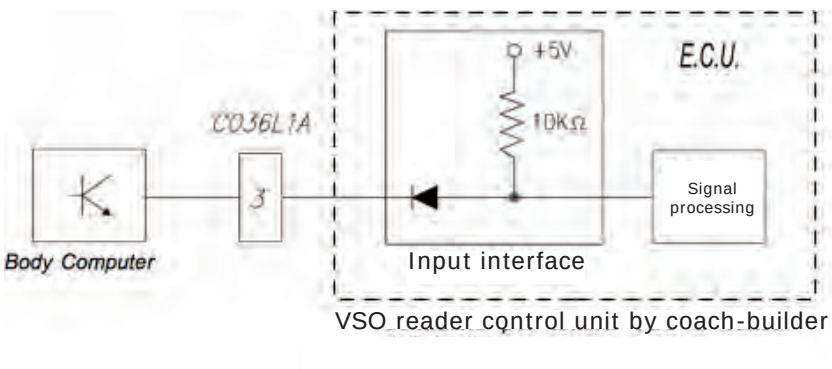
Figure 10



Ground point nearest to component: choice between A, B, C or pin 2 of connector C036L1C

Vehicle speed signal (VSO)

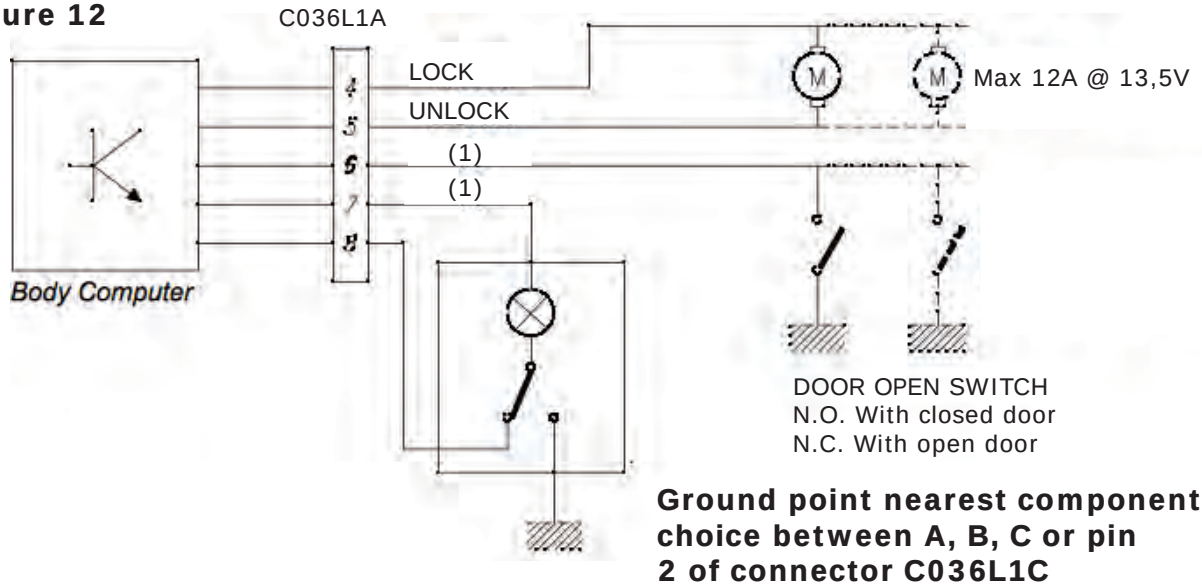
Figure 11



The VSO signal is defined as 275.714 mm/pulse, thus for the receiver, speed is equal to:
V.vehicle [mm/s] = Frequency VSO [Hz] * 275.714 [mm/pulse]
When vehicle velocity is 0 kph the VSO signal has high digital level and 0 pulse/s, instead, when vehicle velocity is not valid the VSO signal has low digital level.

Rear locks and ceiling light control

Figure 12



Ground point nearest component: choice between A, B, C or pin 2 of connector C036L1C

Note (1): In the absence of door open switch (if original Fiat Chrysler Automobiles S.p.A. locks are not used, see chapter 6) pin 6 of connector C036L1A can be left disconnected.
Attention: in this case the rear lock/s may be locked even with the door/s open. The instrument panel will not indicate door status and the rear ceiling light/s will not be commanded.
It is therefore the responsibility of the coach builder to illustrate the difference in function to that described in the use and Maintenance Handbook.

Note (2):pin 7 of connector C036L1A provides +12V for 15 minutes after the key is removed(+KEY = off), after which time the rear ceiling light will not be usable until the next rear door open switch status change (where present), otherwise until the door is unlocked or the key turned (+KEY = on).

- Function with 2 key remote control: releases the two driver cab locks and turns on the in-cab light fixture.

- Function with 3 key remote control: separate front/rear unlock and separate switch on of corresponding interior lights.

Action	FrontLock	RearLock	UnlockCom	Act. Time	Front State	Rear State
Lock Rear						
Initial State	-	-	-	-	Any	Any
Lock Rear	-	+	-	400 + t_1 ms		
Final State	-	-	-	-	No Change	Locked
Lock Front						
Initial State	-	-	-	-	Any	Any
Lock Rear	+	-	-	400 + t_1 ms		
Final State	-	-	-	-	No Change	Locked
Lock Front / Rear						
Initial State	-	-	-	-	Any	Any
Lock Rear	+	+	-	400 + t_1 ms		
Final State	-	-	-	-	Locked	Locked
Lock Front / Rear						
Initial State	-	-	-	-	Any	Any
Lock Rear	+	+	-	400 + t_1 ms		
Final State	-	-	-	-	Locked	Locked
Unlock Rear (Front locked)						
Initial State	-	-	-	-	Locked	Any
Confirm Lock Front/Rear	+	+	-	20 + t_2 ms		
Unlock Rear	+	-	+	400 + t_1 ms		
Confirm Unlock Front	+	-	-	20 + t_2 ms		
Final State	-	-	-		Locked	Unlocked
Unlock Rear (Front unlocked)						
Initial State	-	-	-	-	Unlocked	Any
Confirm Lock Front/Rear	-	+	-	20 + t_2 ms		
Unlock Rear	+	-	+	400 + t_1 ms		
Confirm Unlock Front	-	-	+	20 + t_2 ms		
Final State	-	-	-		Unlocked	Unlocked
Unlock Front (Rear locked)						
Initial State	-	-	-		Any	Locked
Confirm Lock Front/Rear	+	+	-	20 + t_2 ms		
Unlock Front	-	+	+	400 + t_1 ms		
Confirm Lock Rear	-	+	-	20 + t_2 ms		
Final State	-	-	-		Unlocked	Locked

Unlock Front (Rear unlocked)

Initial State	-	-	-		Any	Unlocked
Confirm Lock Front	+	-	-	20 + t_2 ms		
Unlock Rear	-	+	+	400 + t_1 ms		
Confirm Unlock Front	-	-	+	20 + t_2 ms		
Final State	-	-	-		Unlocked	Unlocked

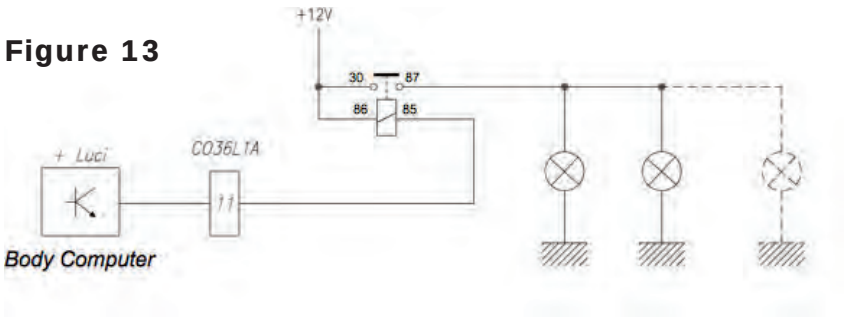
Unlock Front / Rear

Initial State	-	-	-		Any	Any
Confirm Lock Front/Rear	+	+	-	20 + t_2 ms		
Unlock Front/ Rear	-	-	+	400 + t_1 ms		
Final State	-	-	-		Unlocked	Unlocked

Tollerances 0<t1<10%
0<t2<10ms

Side marker lights

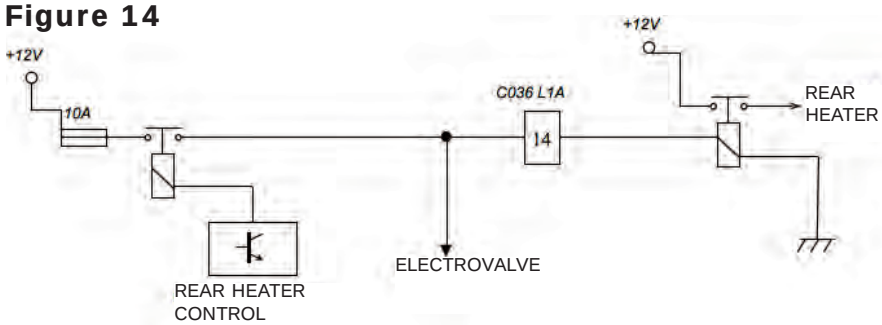
Figure 13



Ground point nearest to component: choice between A, B, C or pin 2 of connector C036L1C

Rear heater enable control

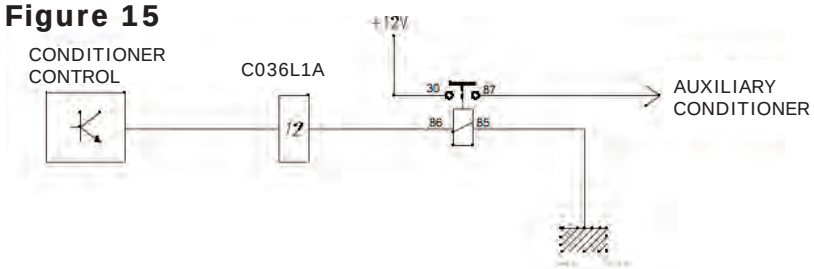
Figure 14



Ground point nearest to component: choice between: A, B, C or pin 2 connector C036L1C

Conditioner on signal

Figure 15

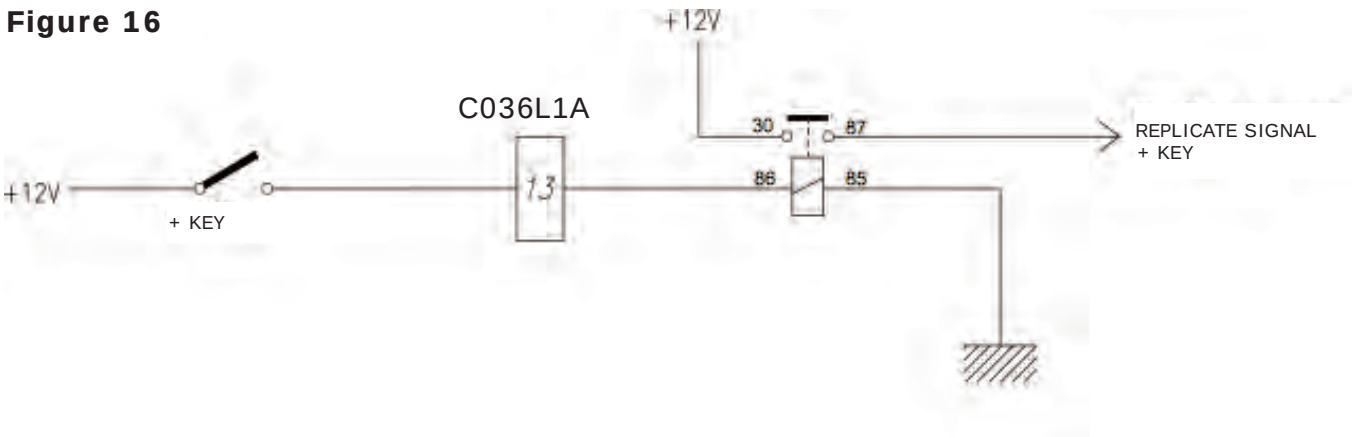


Ground point nearest to component: choice between A, B, C or pin 2 of connector C036L1C

Key ON signal (+KEY)

If it is necessary to replicate the +KEY signal, for example for piloting loads with total current > 600 mA, the following circuit is possible

Figure 16

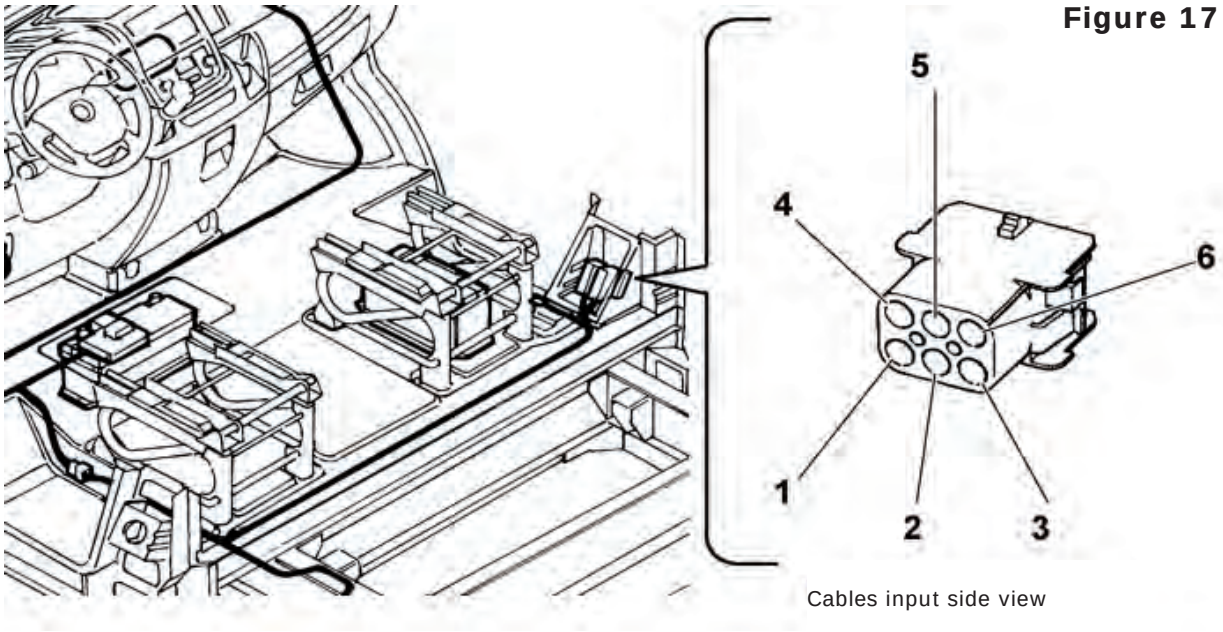


Punto di massa più vicino al componente: a scelta tra A, B, C o pin 2 connettore C036L1C

Connector C036L1B (6-way) – Coach-builder's socket

3D view of connector

Figure 17



Cables input side view

Description of connector functions

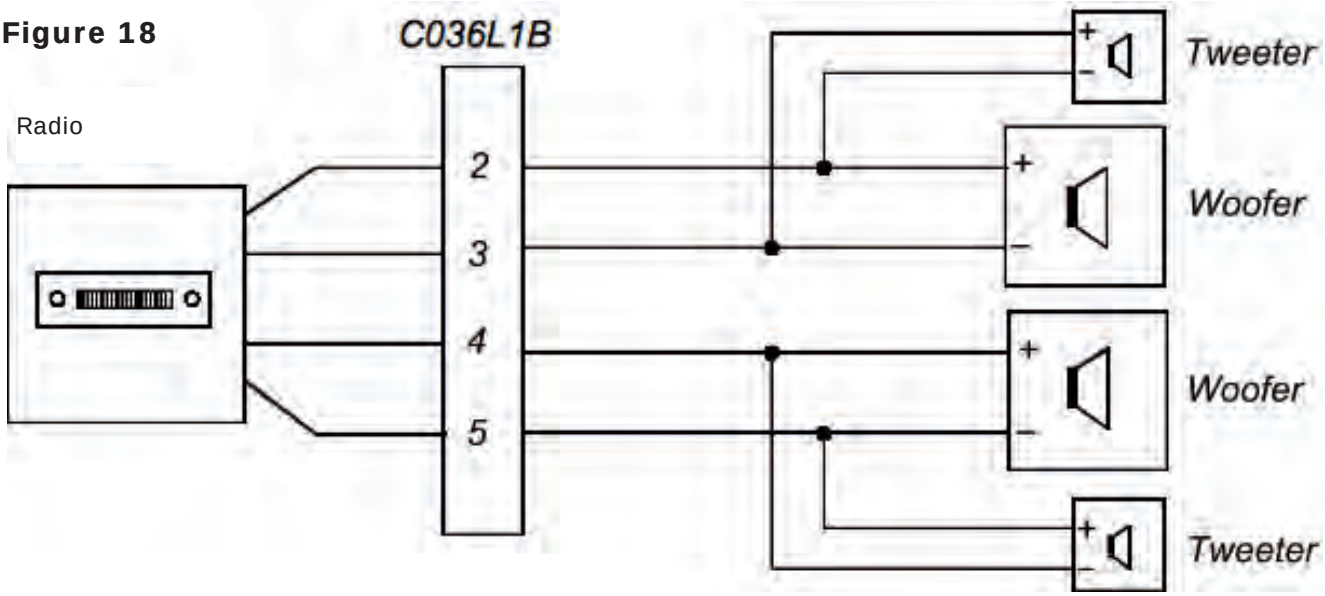
Pin	Function/Connector part number	Minimum cable section [mm²]	cable colour	Notes
	Connector 6-way Tyco p/n 1-480705-0 Counterpart: Tyco p/n 1-480704-0 (by coachbuilder)			Reference to diagram C036-L1B
1	Permanent 12V power supply (+30) for radio	1,5	RG	Permanent supply from auxiliary battery to radio cable present only from C036-L1A to Y028L1A(1)
2	Rear RH loudspeaker +	1	LR	(2)
3	Rear RH loudspeaker -	1	LN	(2)
4	Rear LH loudspeaker +	1	B	(2)
5	Rear LH loudspeaker -	1	BV	-2
6	Not connected	-	-	-

(1) NOTE: the connection from connector Y028L1A to radio is made by the coach-builder, who must suitably isolate the radio power supply present in the vehicle main system (see description in paragraph 4.2.4 – Figure 19)

(2) Fiat Chrysler Automobiles S.p.A. radio power output: 13.4W at 14V
Fiat Chrysler Automobiles S.p.A. radio drivers: 4 ohm equivalent for each channel
Fiat Chrysler Automobiles S.p.A. Tweeters: 15W RMS max
Fiat Chrysler Automobiles S.p.A. Mid-range and Full-range: 20W RMS max

Rear loudspeaker connection

Figure 18

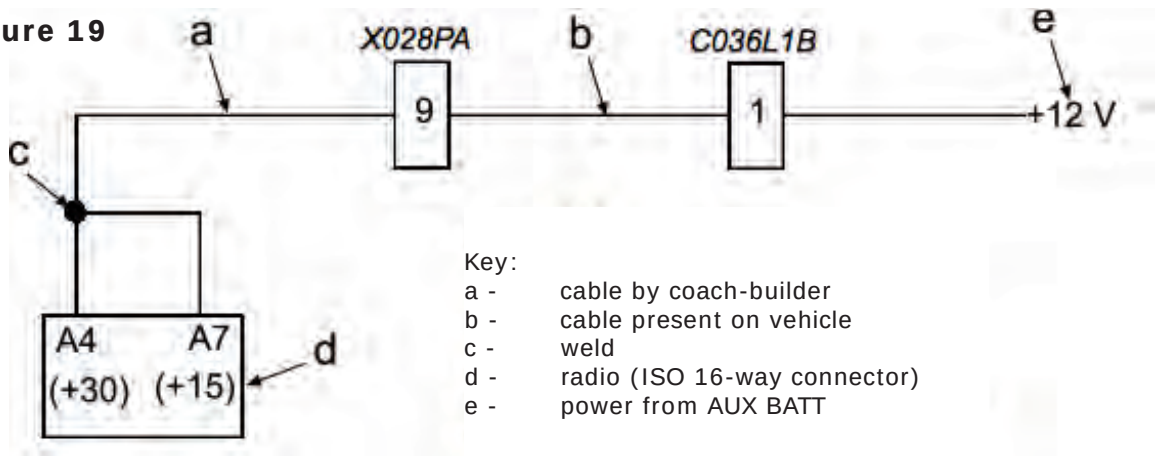


Radio permanent power supply

If the radio requires a permanent power supply even with the key off (1) (+KEY= off) the following circuit is possible.

CAUTION: This setting can cause a faster main battery discharge.

Figure 19

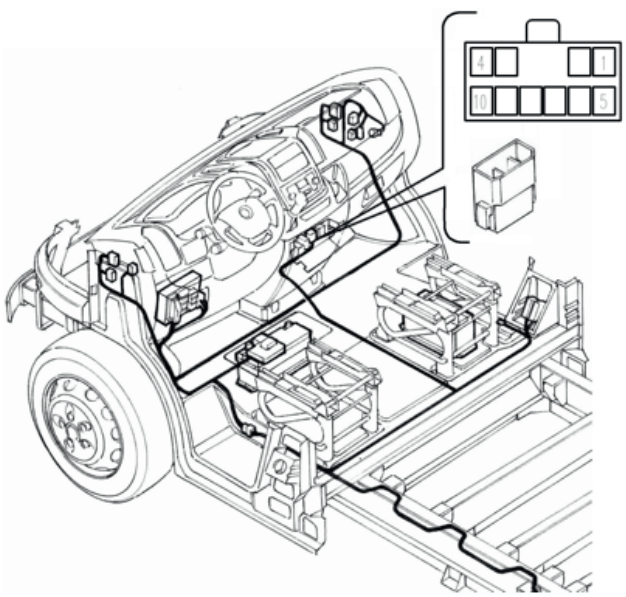


Key:
a - cable by coach-builder
b - cable present on vehicle
c - weld
d - radio (ISO 16-way connector)
e - power from AUX BATT

Terminal for hole 9 of connector X028PA: Tyco p/n 282375-1 (cable 1.5 mm^2)

After removing the terminals of the original wires from position A4 and A7 on the radio 16-way ISO connector, apply an adequate amount of insulating tape to prevent accidental reciprocal contact or with metal parts.

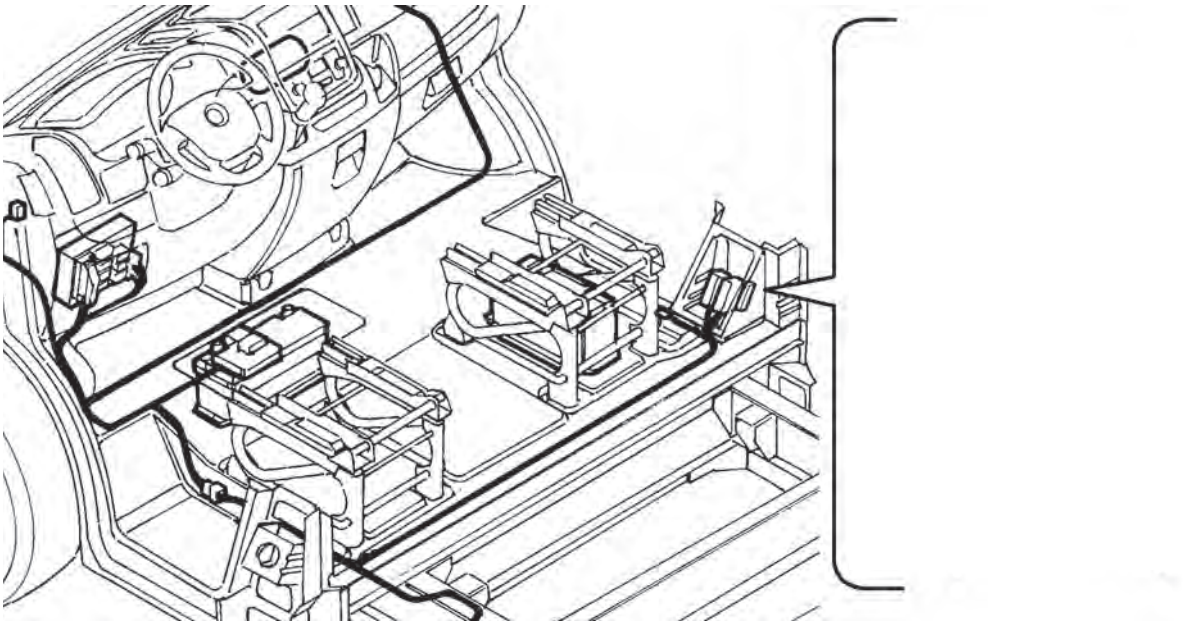
Figure 20



(1) Operation only allowed with radio installed aftermarket (for example Fiat Chrysler Automobiles S.p.A. accessory line).

ATTENTION: this modification is not allowed with a Fiat Chrysler Automobiles S.p.A. standard radio.

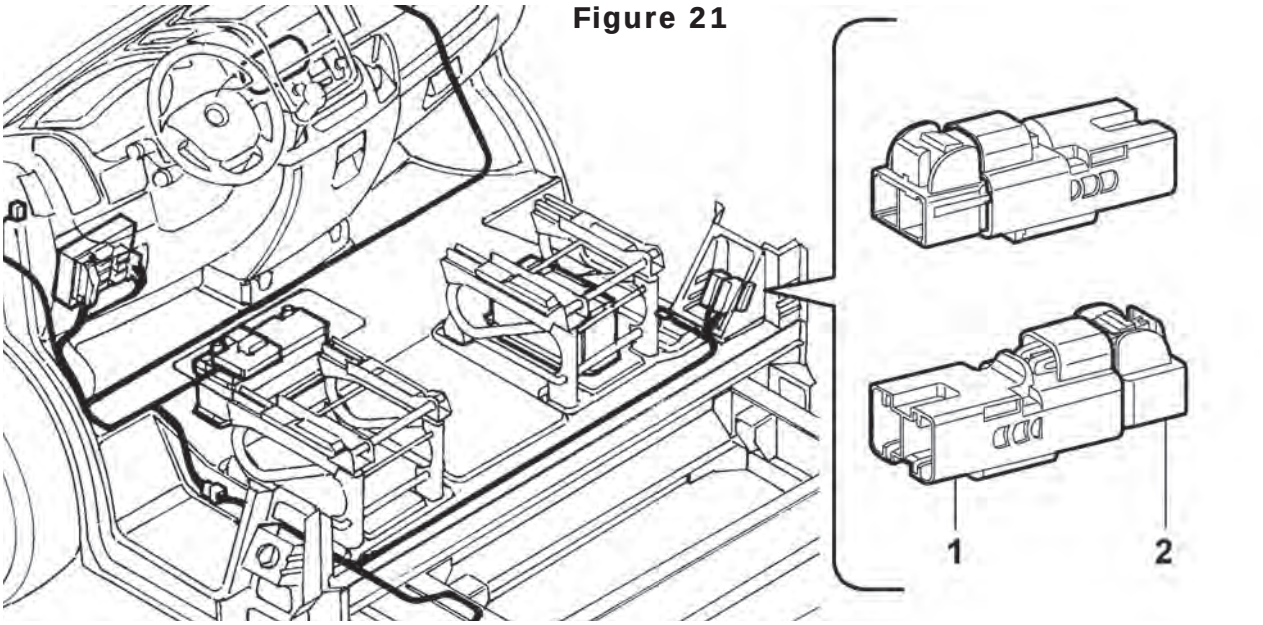
Retrocamera



Connector C036L1C (2-way) – Coach-builder's socket

3D view of connector

Figure 21



1. Connector C036 L1C, 2-way – 2. Connector provided by Fiat Chrysler Automobiles S.p.A. for wiring by coach-builder.

Description of connector functions

Pin	Function/Connector Part number	Minimum cable section [mm²]	cable colour	Notes
	Connector, 2-way MTA p/n 45.40300 Counterpart: MTA p/n 45.40400			Reference to diagram C036-L1C
1	+30 power supply	10	R	Fuse nominal current 50A
2	Power ground	10	N	Max. constant current 53A

+12V power supply from main battery

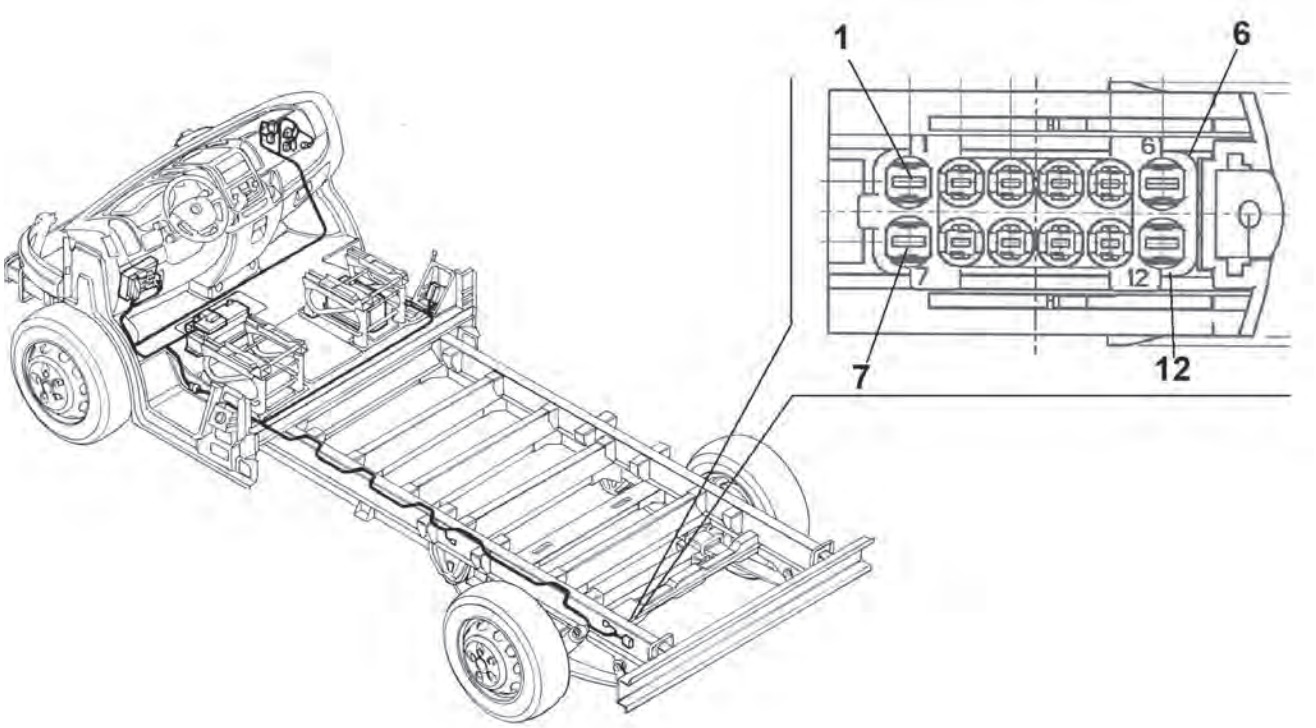
See paragraph 4.1.4

Power ground (pin 2)

Used in alternative to ground points A, B and C on chassis (see Figure 2)
Protect added cables in specific sheathing or corrugated conduits.
Minimum cable section must always be as specified in the description tables.

Connector Y203L4A (12-way) – Rear lights
2D view of connector

Figure 22



Description of connector functions

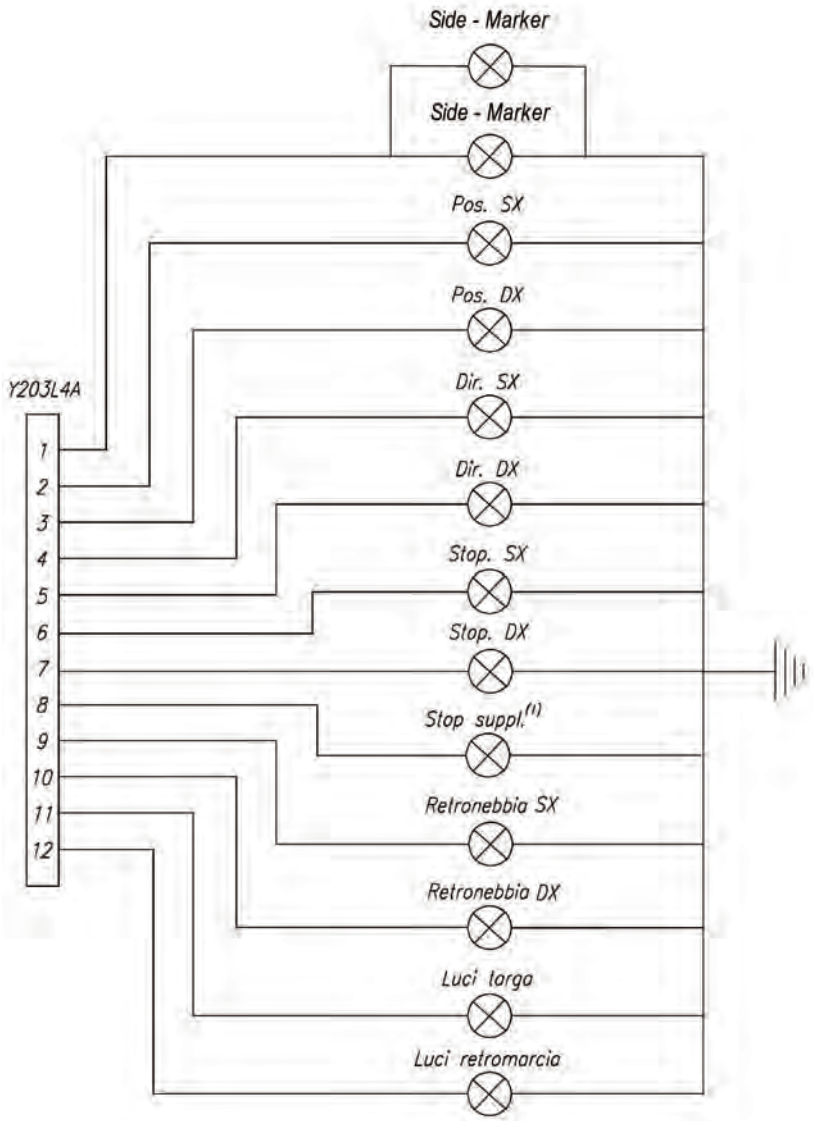
Pin	X2/50 Function / Connector Part number	Minimum cable section [mm^2]	Cable colour	Notes
	Connector 12-way Tyco p/n 284844-1 Counterpart: p/n 284848-3 (by coach-builder)			
1	Side - marker	0.5	GR	2 5W - 12V bulbs
2	LH rear marker light	0.5	GV	2 5W - 12V bulbs
3	RH rear marker light	0.5	G	2 5W - 12V bulbs
4	LH rear direction indicator	0.5	SN	1 21W - 12V bulb
5	RH rear direction indicator	0.5	S	1 21W - 12V bulb
6	LH stop light	0.5	VN	1 21W - 12V bulb
7	RH stop light	0.5	V	1 21W - 12V bulb
8	Third stop light	0,5	L	P_{MAX}= 21W at 12V alternative to the one on C036L1A
9	LH rear fog warning (1)	0,5	MN	1 21W - 12V bulb
10	RH rear fog warning (1)	0,5	M	1 21W - 12V bulb
11	License plate lights	0,5	GN	PMAX= 10W at 12V
12	Reversing lights	1,5	BR	PMAX= 42W at 12V

(1) It is also possible to install a single 21W – 12V rear fog warning light (for example GSX, left fog light only).

NOTE: For coachbuilders willing to use lights with different power absorption (lower power or LED), the failure diagnosis can be deactivated via the WYTECH Plus tool.
On some versiont those diagnosis is already switched off.

Taillights

Figure 23

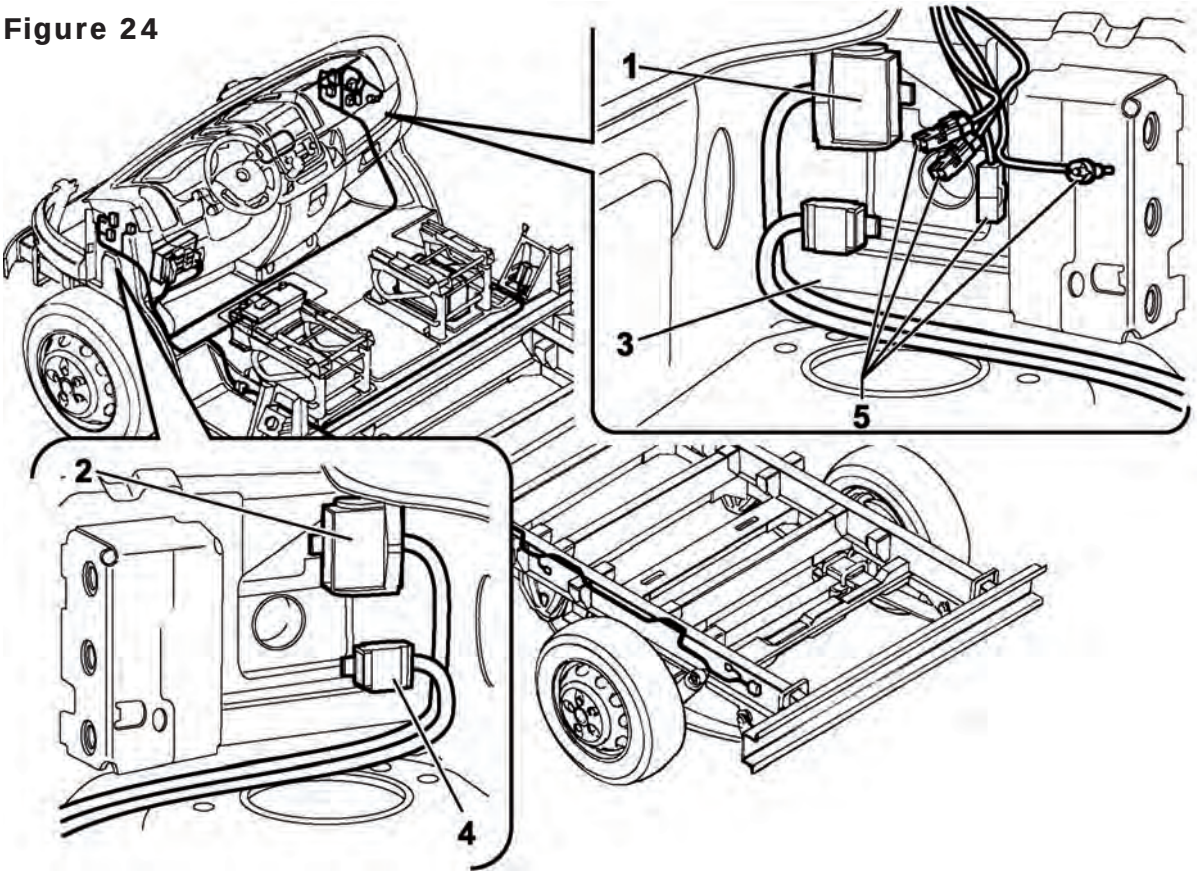


(1) **Alternatively, the third stop can be connected to pin 8 of connector Y203L4A - pin 8.**

ATTENTION: it is forbidden to connect either pin 1 of connector C036L1A, or pin 8 of connector Y203L4A.

Front door and aerial connectors

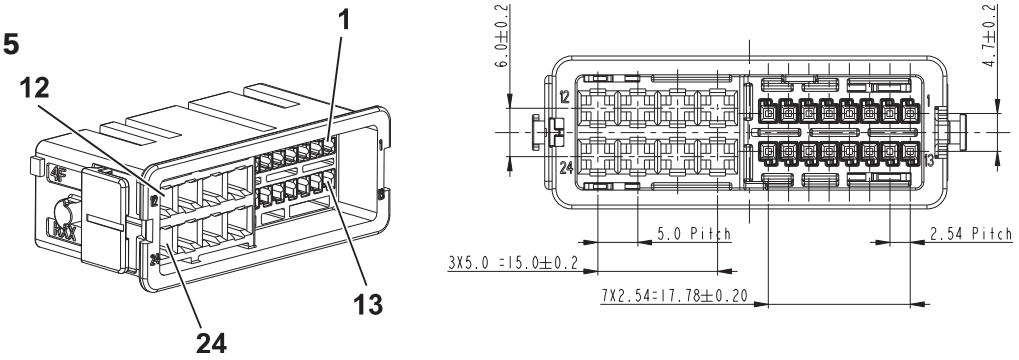
Figure 24



1 and 2 – front door connectors (Y001LA and Y002LA)
3 and 4 – front door opt. connectors (Y121L1A and Y116L1A)
5 – AM/FM aerial connectors

Connector Y001LA (24-way) – Driver's side door
3D view of connector

Figure 25



Description of connector functions

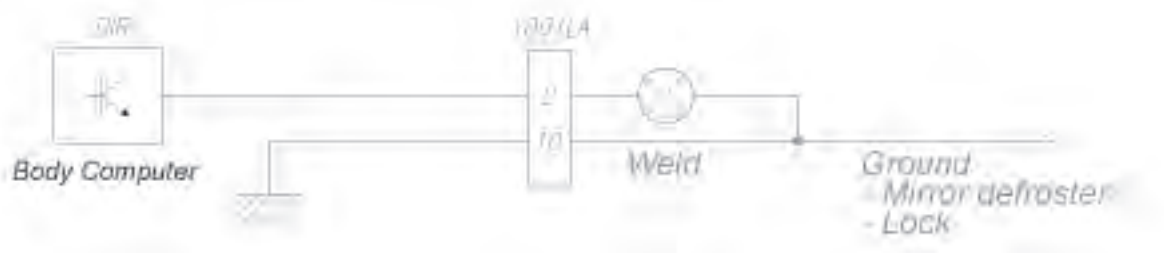
Pin	Operation/Part number Connector	Wire cross-section area (mm²)	Wire colour
	L side: F.C. 24-way FCI p/n 1 721 24 01 (Y001LA) S side: M.C. 24-way FCI p/n 1 721 24 00 (X001SA)		
1	Load compartment door state LED	0,35	BH
2	Driver's side direction indicator	0,35	ZR
3	Door open signal	0,35	BZ
4	Door mirror defroster supply	0,75	RV
5	External temperature sensor - GND	0,35	HR
6	Supply/lighting for DDC and comfort enable mirror controls	0,5	BL
7	Load compartment doors lock/unlock signal	0,35	HB
8	Lock/unlock signal from lock	0,35	LG
9	Electric window motor supply - Up	1,5	RN
10	Earth (direction indicators, lock, mirror defroster) DDC	1	N
11	Electric window motor supply - Down	1,5	NR
12	External temperature sensor - Signal	1,5	H
13	Passenger side electric window up signal from DDC	0,35	HV
14	Passenger side electric window down signal from DDC	0,35	HM
15	Main passenger's side door mirror up/down	0,35	MN
16	Main passenger's side door mirror left/right	0,35	BR
17	Secondary passenger's side door mirror up/down	0,35	BZ
18	Secondary passenger's side door mirror left/right	0,35	BV
19	Passenger's side door mirror motor common	0,35	HN
20	Not Connected		
21	Driver's side speaker (+)	0,5	G
22	Driver's side speaker (-)	0,5	GN
23	Feed for Door Motor Lock	1	BN
24	Feed for Door Motor Unlock	1	CV

Note: This connector is supplied as fitting if the original New Ducato doors are not used.
(1) for the versions with robotised gearbox (option 407), the pin must be connected according to the scheme in figure 27.

Side direction indicator lights

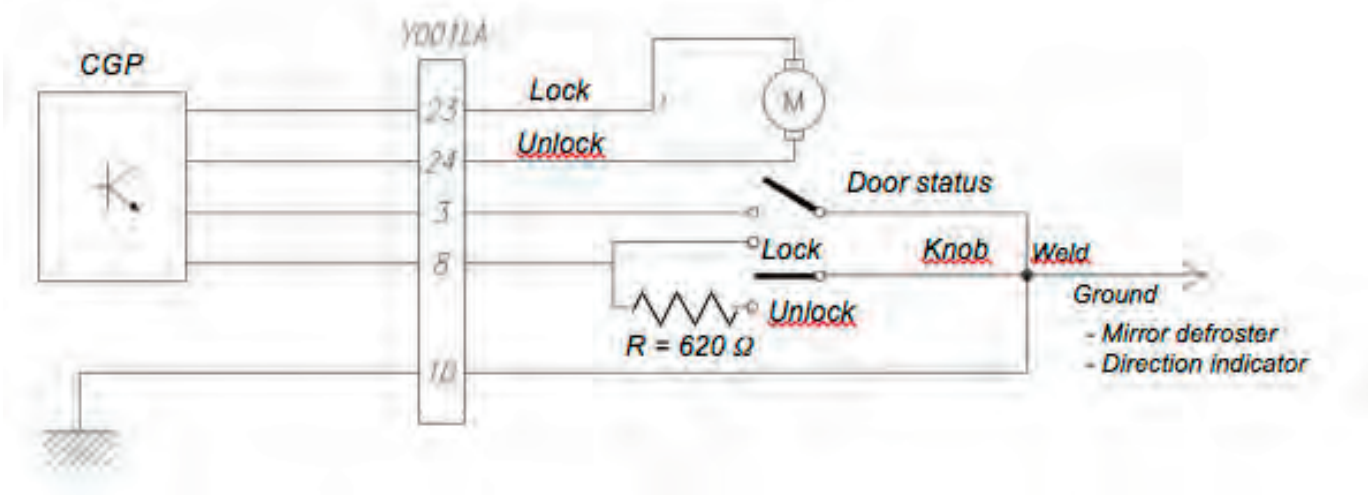
Lampada da 16W - 12V

Figure 26



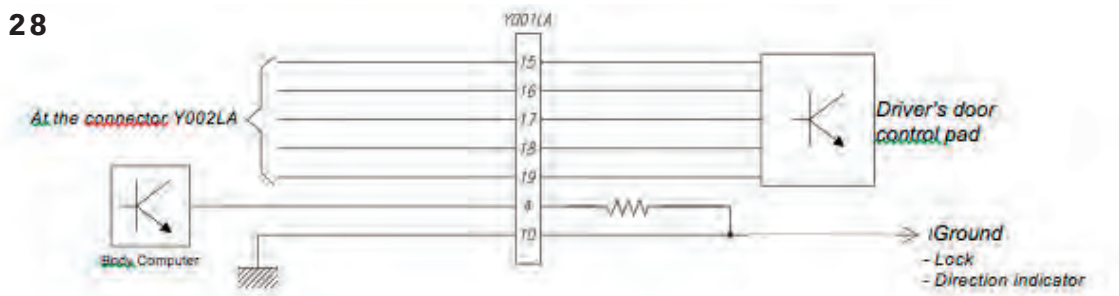
Driver's side lock control

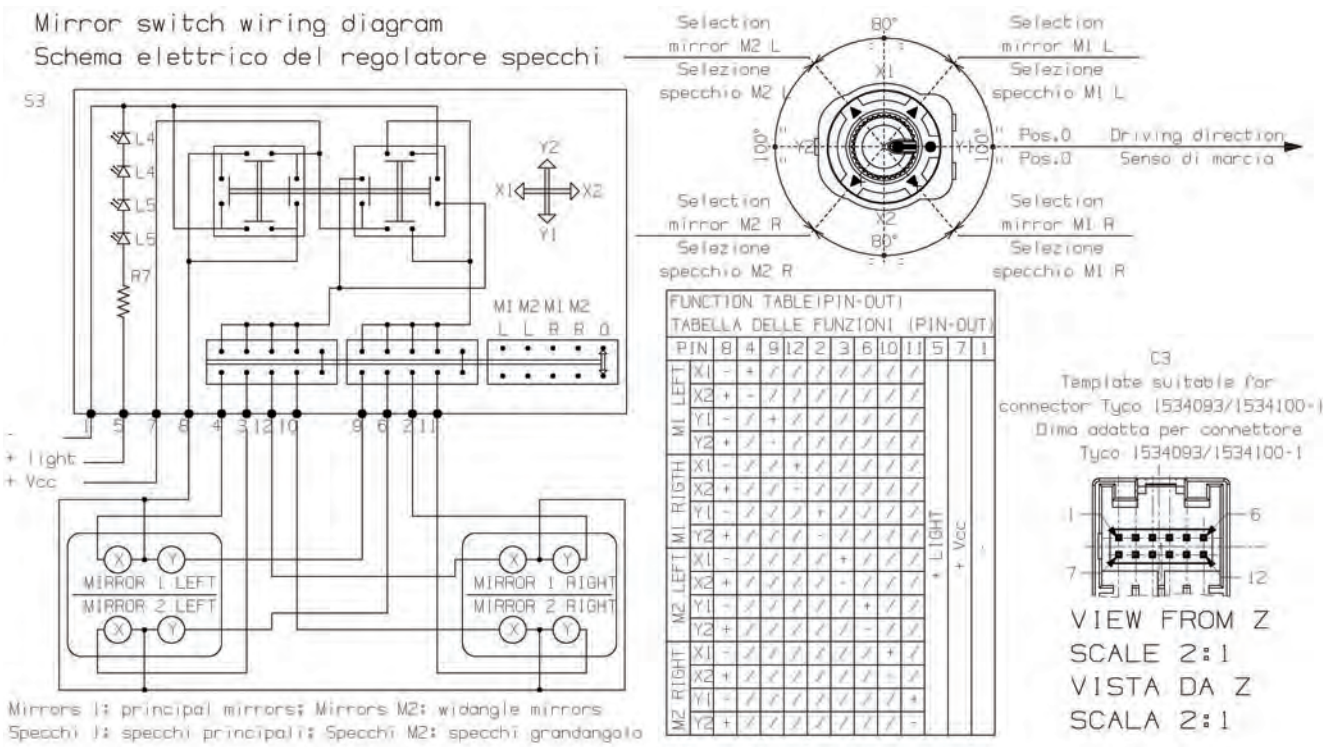
Figure 27



External electric mirror

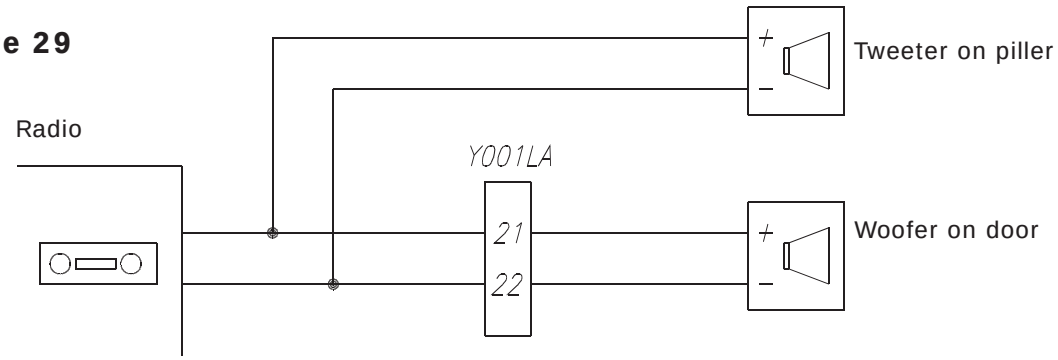
Figure 28





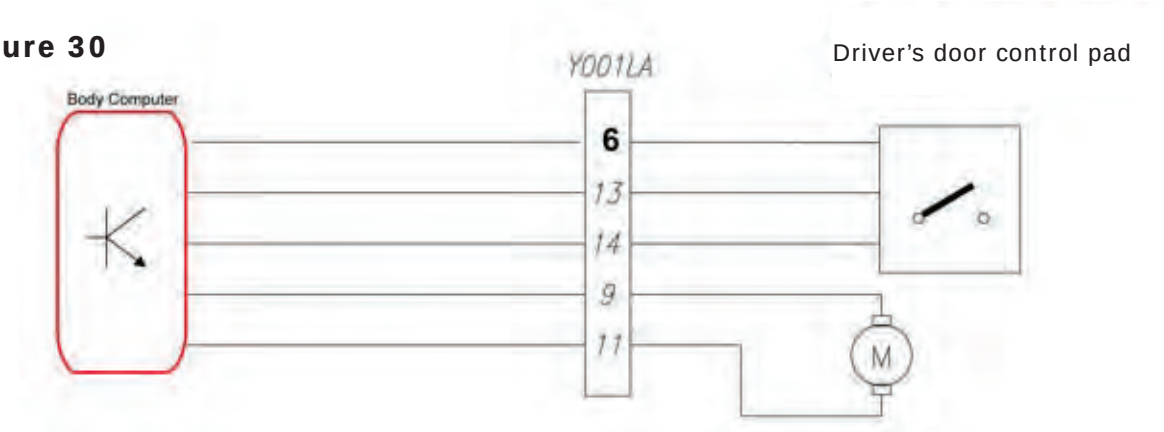
Driver's side loudspeaker

Figure 29

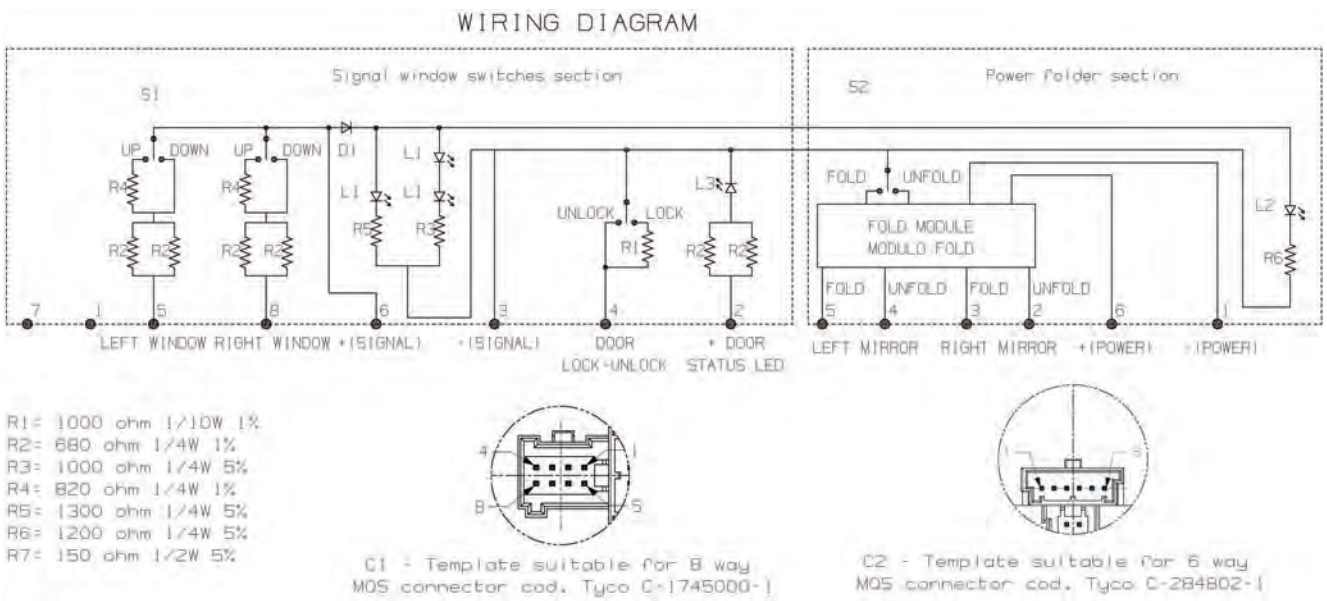


Electric window winder

Figure 30

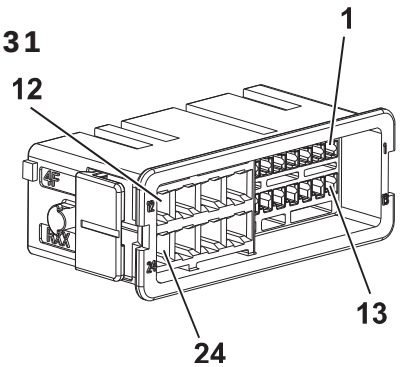


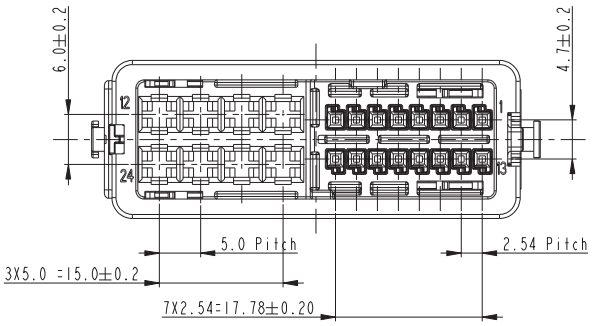
Control cluster – driver side



Connector Y002LA (24-way) – Passenger side door
3D view of connector

Figure 31





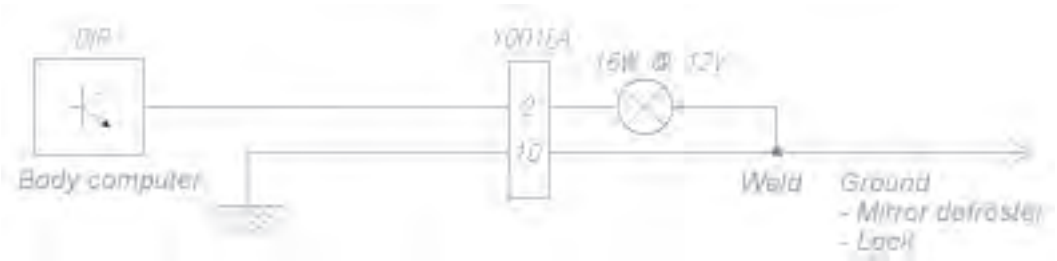
Description of connector functions

Pin	Operation/Part number Connector	Wire cross-section area (mm^2)	Wire colour
	L side: F.C. 24-way FCI p/n 1 721 24 01 (Y002LA) D side: M.C. 24-way FCI p/n 1 721 24 00 (X002DA)		
1	Not connected	-	-
2	Passenger's side direction indicator	0,35	ZB
3	Door open signal (CTRL_GND)	0,35	BN
4	Wing mirror defroster	0,75	RV
5	Not connected	-	-
6	CDC supply/lighting (service 2 T13 relay)	0,5	BL
7	Not connected	-	-
8	Not connected	-	-
9	Passenger's side window winder supply	2,5	R
10	Earth (direction indicators, lock, mirror defroster)	1	N
11	Passenger's side window winder earth	2,5	NZ
12	Not connected	-	-
13	Not connected	-	-
14	Passenger side window winder down signal	0,35	HR
15	Main passenger's side wing mirror up/down	0,35	MN
16	Main passenger's side wing mirror left/right	0,35	BR
17	Secondary passenger's side wing mirror up/down	0,35	BZ
18	Secondary passenger's side wing mirror left/right	0,35	BV
19	Passenger's side wing mirror motor common	0,35	HN
20	Not connected	-	-
21	Passenger's side speaker (+)	0,5	ZC
22	Passenger's side speaker (-)	0,5	ZN
23	Lock/unlock control	1	BN
24	Lock motors common	1	CV

Note: This connector is supplied as pre-fitting if the original New Ducato doors are not present.
(1) if door not present leave unconnected

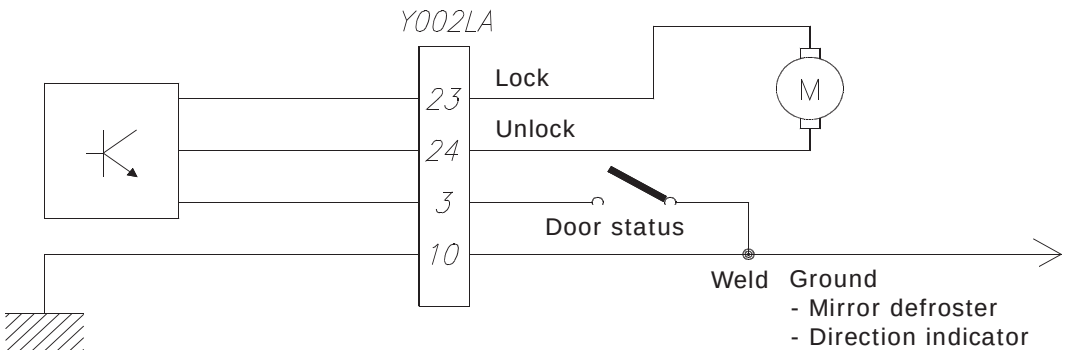
Side direction indicator light

Figure 32



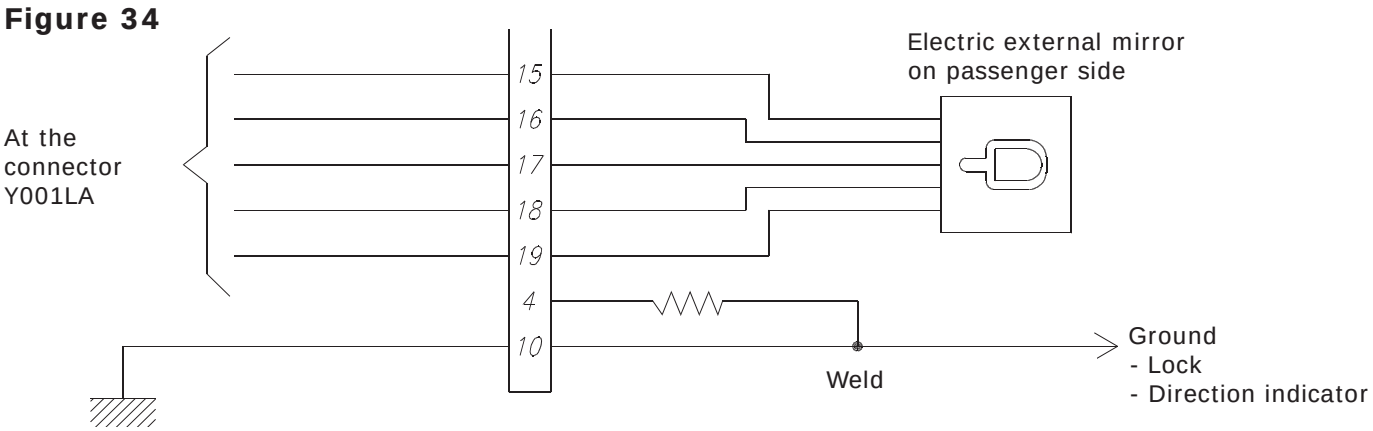
Passenger side door control

Figure 33



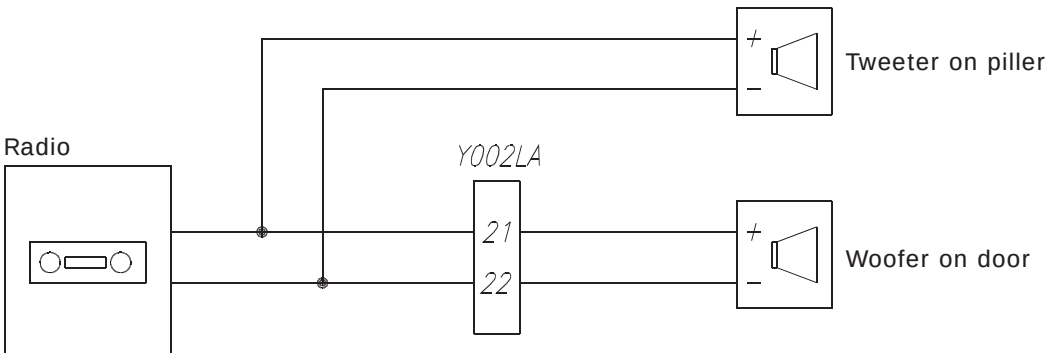
Electric external mirror

Figure 34



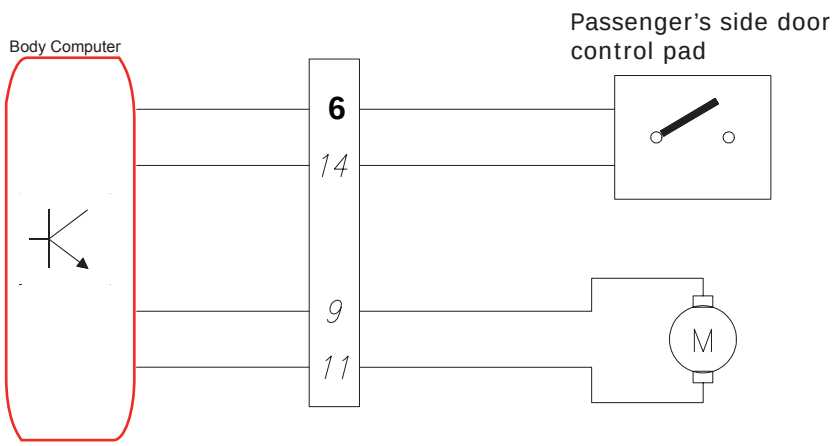
Passenger side loudspeaker

Figure 35



Electric window winder

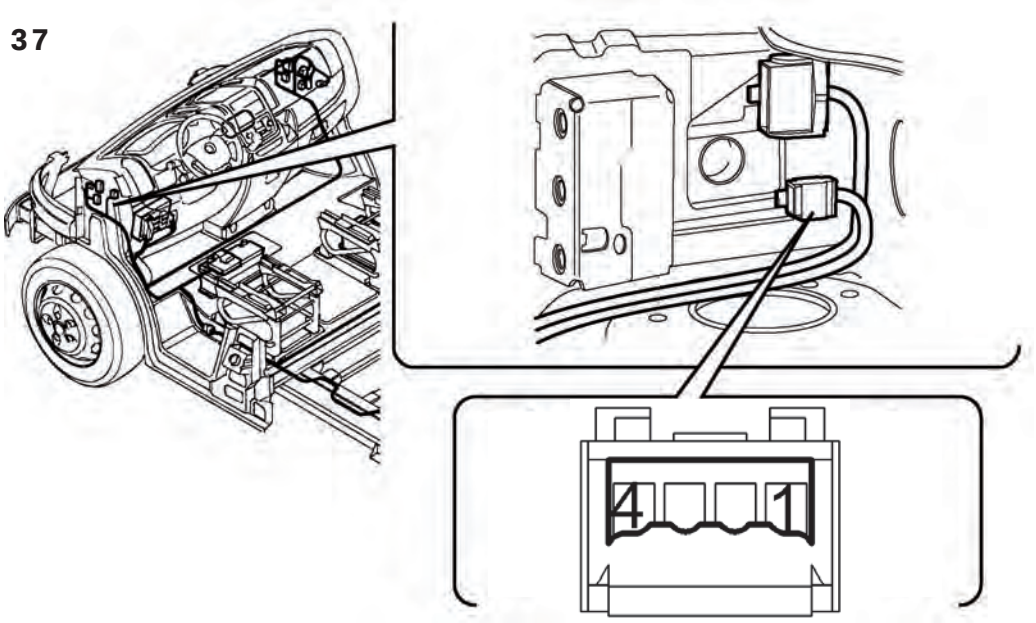
Figure 36



For internal scheme of the control panel refer to Sec. 1.16.7 for the power window winder only.

Connector Y121LA (4-way) – Driver's side door (opt)
2D view of connector

Figure 37

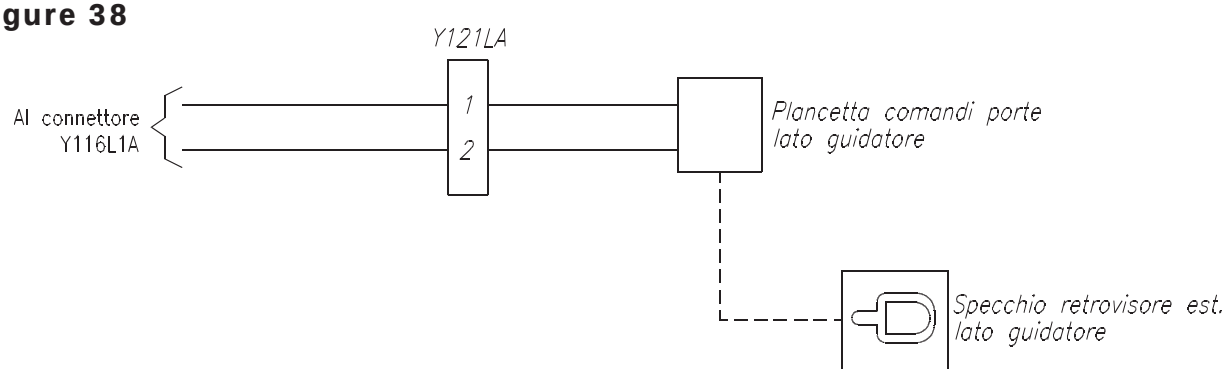


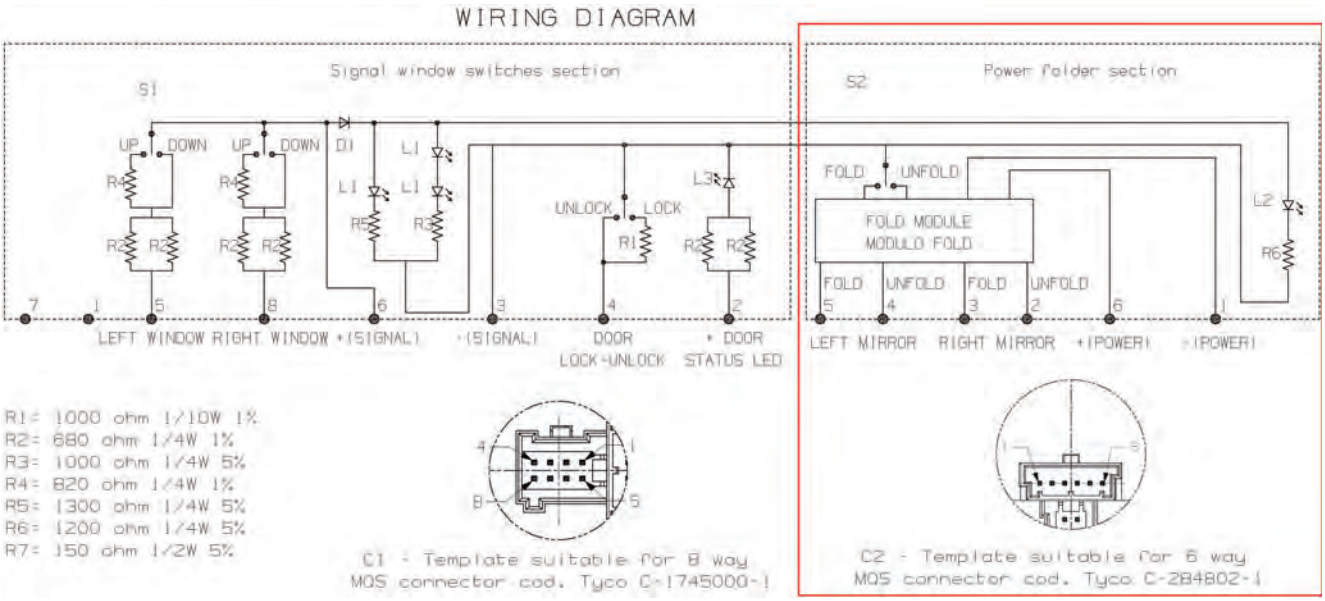
Description of connector functions

Pin	Function/Connector part number	Minimum cable section [mm²]	Cable colour	Notes
	4-way Tyco connector p/n 174929-1 Counterpart: Tyco p/n 174922-1 (by coach builder)			
1	P.S. ext. mirror deflect	0,5	HM	External mirror electric deflection
2	P.S. ext. mirror restore	0,5	N	External mirror electric deflection
3	MIRROR FOLDING +KEY	0,35	HR	External mirror electric deflection
4	DEAD LOCK	0,35	HV	Dead-lock control

External rear-view mirror deflection

Figure 38





Highlighted section refers to mirror folding module.

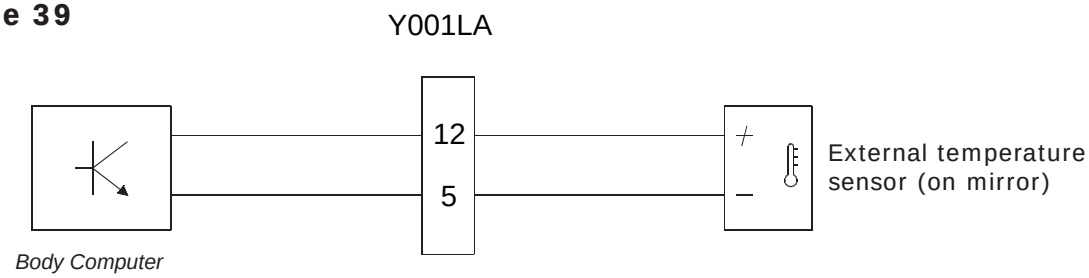
1.17.1.2 Specification of folding module for external rear-view mirrors

- Max Time-Out time: 8 sec (i.e. in the event of a system malfunctioning power to mirror motors is cut after 8 second from activation);
- Reading and memorization of start-up current;
- Current reading during actuation;
- Lock current check (defines as 80% of the start-up current);
- Checks if the lock current is permanent or a spike only and cut the power within 500msec;
- The control can be activated 5-6 times within 2min; after that, the actuation is inhibited for 30sec; if the 5th actuation is to open, the control is inhibited, if the 5th actuation is to close, a further open is still allowed;
- Pin 1 and 6 are respectively Ground and Power Plus (+30);
- Pin 2 and 3 feed RH motor and during actuation (open or close) invert the current in the motor itself;
- Pin 3 and 4 feed LH motor and during actuation (open or close) invert the current in the motor itself;
- Pin 6 of 8-pin connector must be fed by Plus Signal, otherwise the electronics doesn't activate any control
- Button driven functions always activate simultaneously both the motors connected to Pin 2-3 and 4-5
- all the system is developed considering the characteristic current curve of Type 250 folding mirror.

Each folding motor has a rolling current of about 200÷400mA and a lock current of 2÷2,5A.

5.3.4 External temperature sensor

Figure 39



If the original New Ducato mirrors are not fitted, it is necessary to use an NTC thermistor with the following specifications:

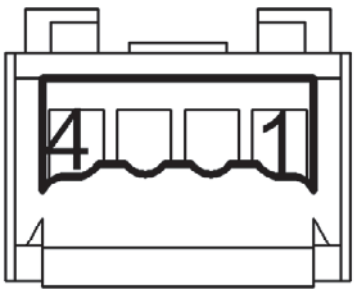
T_{oper} (°C)	R_T/R_{25}
–40	33.21
–35	23.99
–30	17.52
–25	12.93
–20	9.636
–15	7.250
–10	5.505
–5	4.216
0	3.255
5	2.534
10	1.987
15	1.570
20	1.249
25	1.000
30	0.8059
35	0.6535
40	0.5330
45	0.4372
50	0.3605
55	0.2989
60	0.2490
65	0.2084
70	0.1753
75	0.1481
80	0.1256
85	0.1070
90	0.09154
95	0.07860
100	0.06773
105	0.05858
110	0.05083
115	0.04426
120	0.03866
125	0.03387

Parametro	Valore
Resistenza a 25°C (R25)	10 kΩ
Tolleranza su R25	±3%
Dissipazione massima	500 mW
Tempo di risposta	1,2 s
Range operativo di temperatura	da -40 a +125 °C
Categoria climatica	40/125/56

NOTE: In vehicles fitted with automatic climate control (option 140) and/or robotised gearbox (option 407), it is necessary to fit an exterior temperature sensor.

Connector Y116LA (4-way) – Passenger side door (opt)
3D view of connector

Figure 40

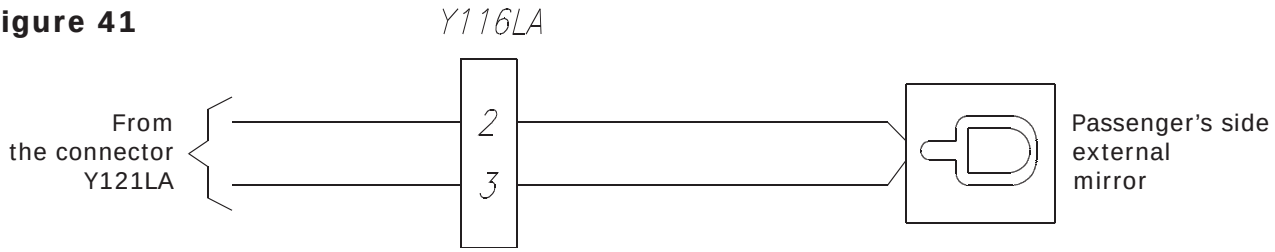


Description of connector functions

Pin	Function/Connector part number	Minimum cable section [mm²]	Cable colour	Notes
	4-way Tyco connector p/n 174929-1 Counterpart: Tyco p/n 174922-1 (by coach-builder)			
1	Not connected			
2	P.S. ext. mirror deflection	0,5	HM	External mirror electric deflection
3	P.S. ext. mirror restore	0,5	N	External mirror electric deflection
4	Not connected	-	-	

External rear view mirror deflection

Figure 41



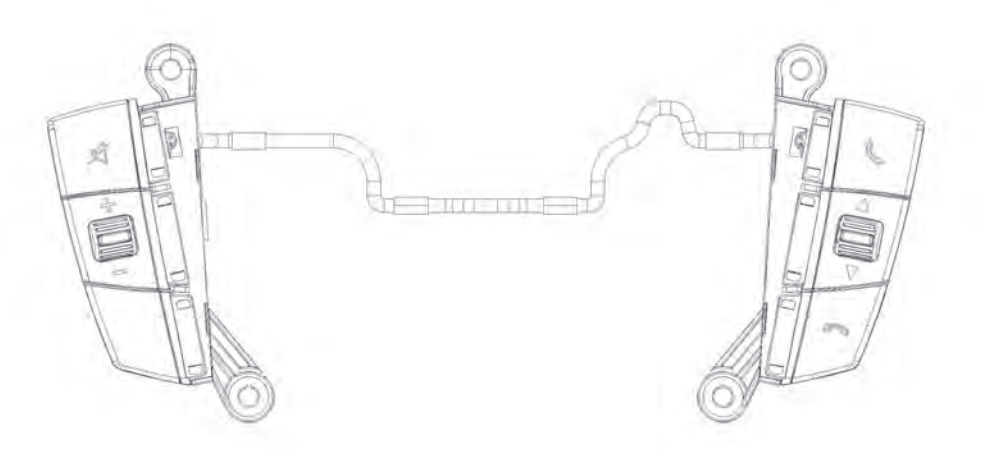
Procedure for setting radio switching off time after key-off (applicable in presence of opt 7BY, 7BZ, 6Q2, 6Q3, 6Q8, 6Q9 only)

1. Switch on the radio.
2. 4. Press MENU to access the menu.
5. Select “System Settings” and press OK button.
6. Thick the “Power OFF” # min. Delay” checkbox, where # is the PROXI set value (180 minutes).

Radio VP1

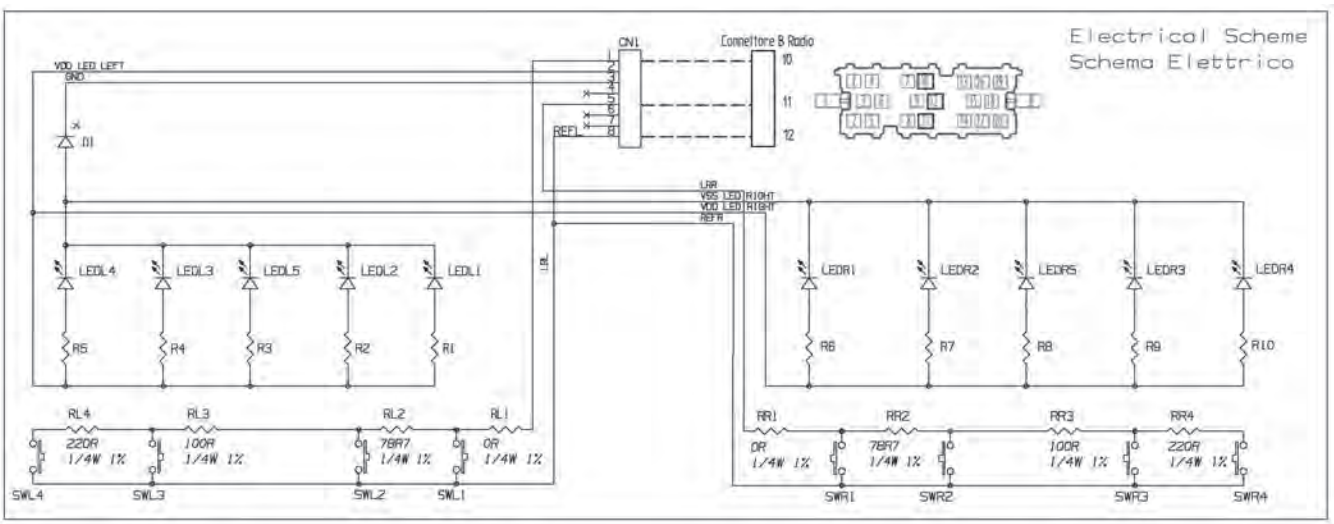
Radio VP2

Vehicles provided with “5BH” - Steering wheel controls for Upfitters



The connector in the radio compartment where the pins of these commands are located is connector B 1/08847/87 20-way FCI.

The resistance coding of Ducato radio controls is as follows:



The pins concerned are:

Signal A: pin 10
Signal B: pin 11
Ground: pin 12

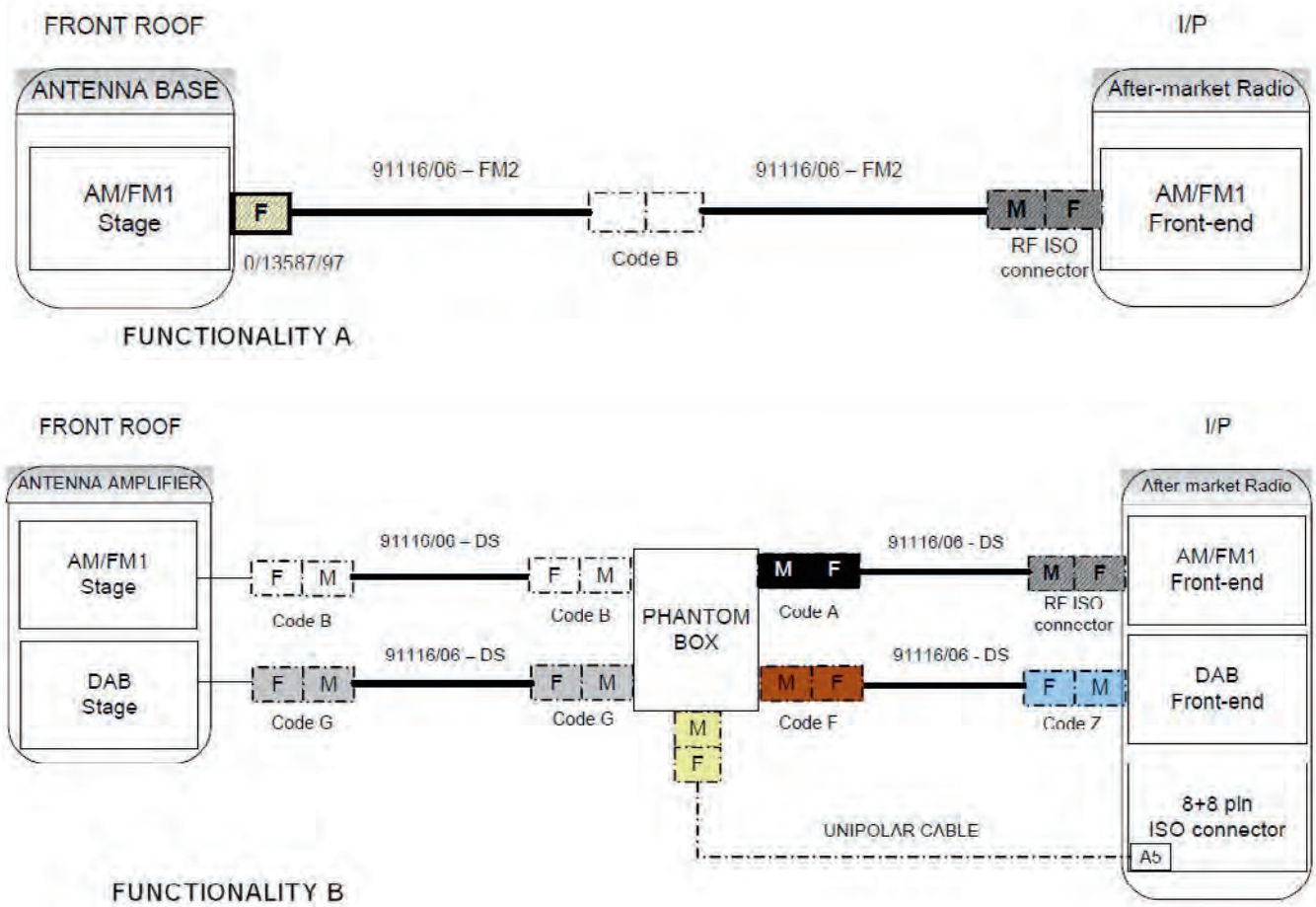
Consequently, it is important to ensure that the radio uses the same resistance coding.

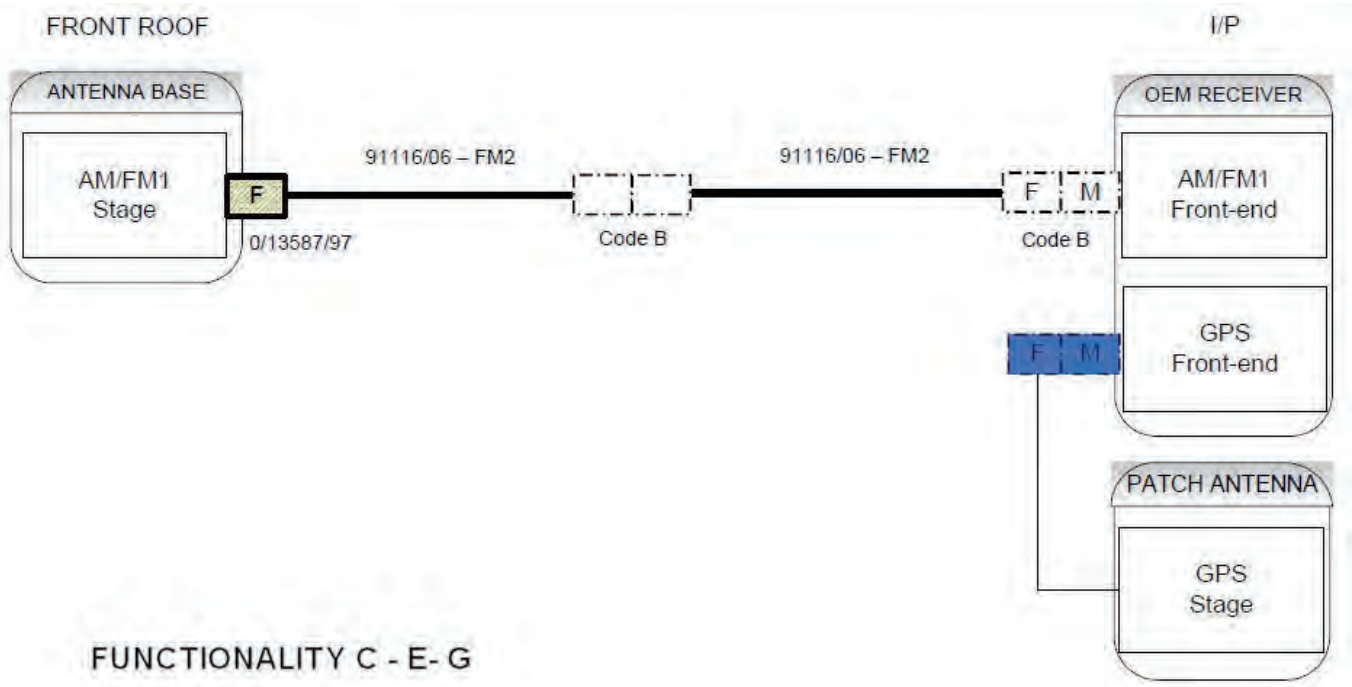
Connector XO50PA (1-pin) – AM/FM radio aerial

According to option configuration, the following type of antenna can be fitted:

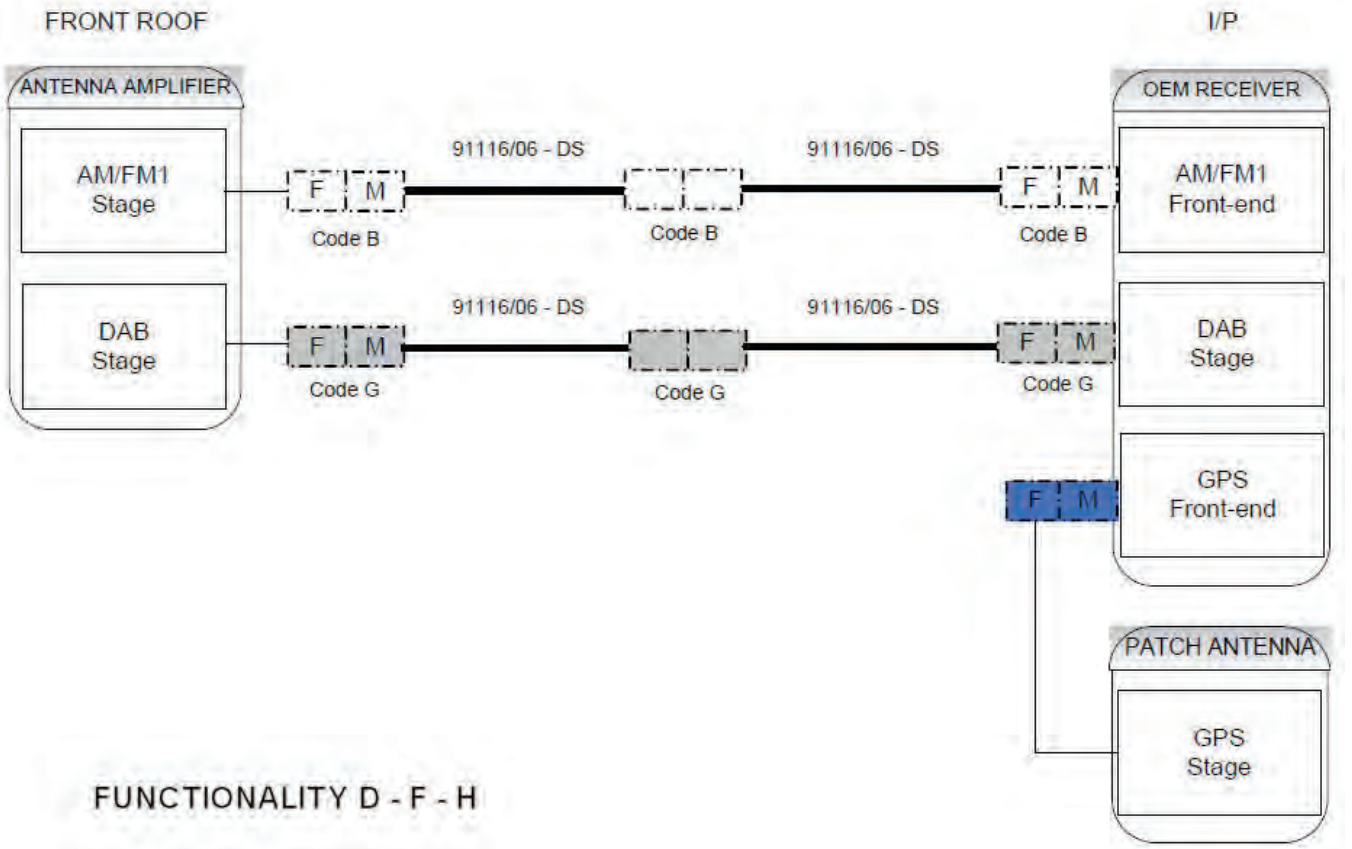
Item	Opt code	Feature	Market
A	082 or 085	Preparation for aftermarket radio (w/ or w/o speakers)	ECE/ROW
B	6QD or 6GD	Preparation for aftermarket DAB radio (w/ or w/o speakers)	ECE
C	6S3	RRM base: AM/FM	ECE, ROW
D	6S4	RRM DAB: AM/FM + DAB	ECE
E	6Q2	LTM base: AM/FM	ECE/ROW
F	6Q3	LTM DAB: AM/FM + DAB	ECE
G	6Q8	LTM NAV: AM/FM + GPS	ECE/ROW
H	6Q9	LTM NAV DAB: AM/FM + GPS + DAB	ECE
I	5AO	AM/FM Side Mirror antenna set	ECE/ROW
J	54Q	AM/FM/DAB Side Mirror antenna set	ECE/ROW

Figure 42

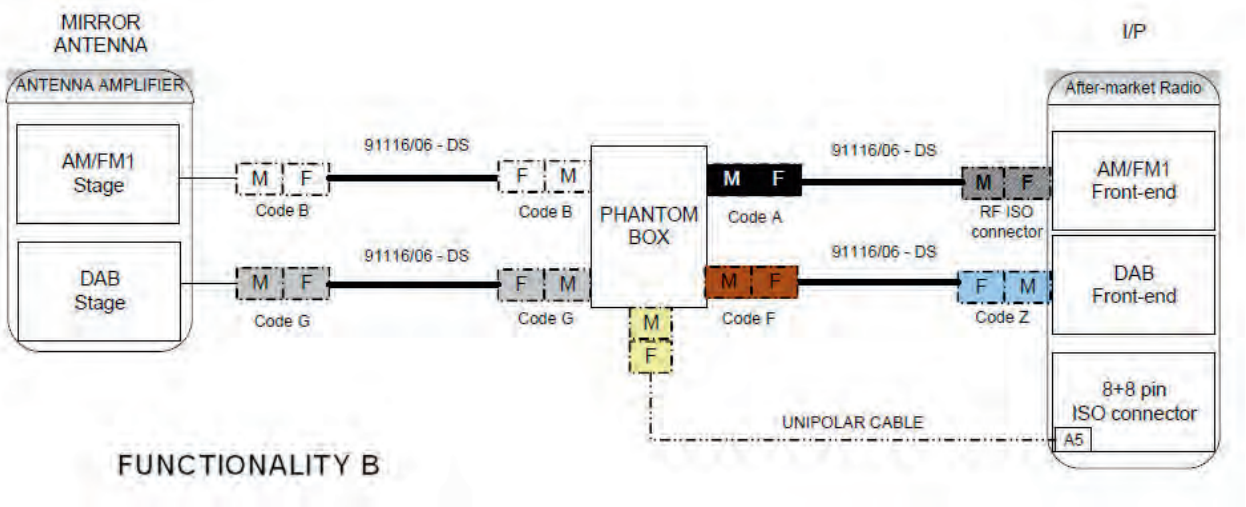




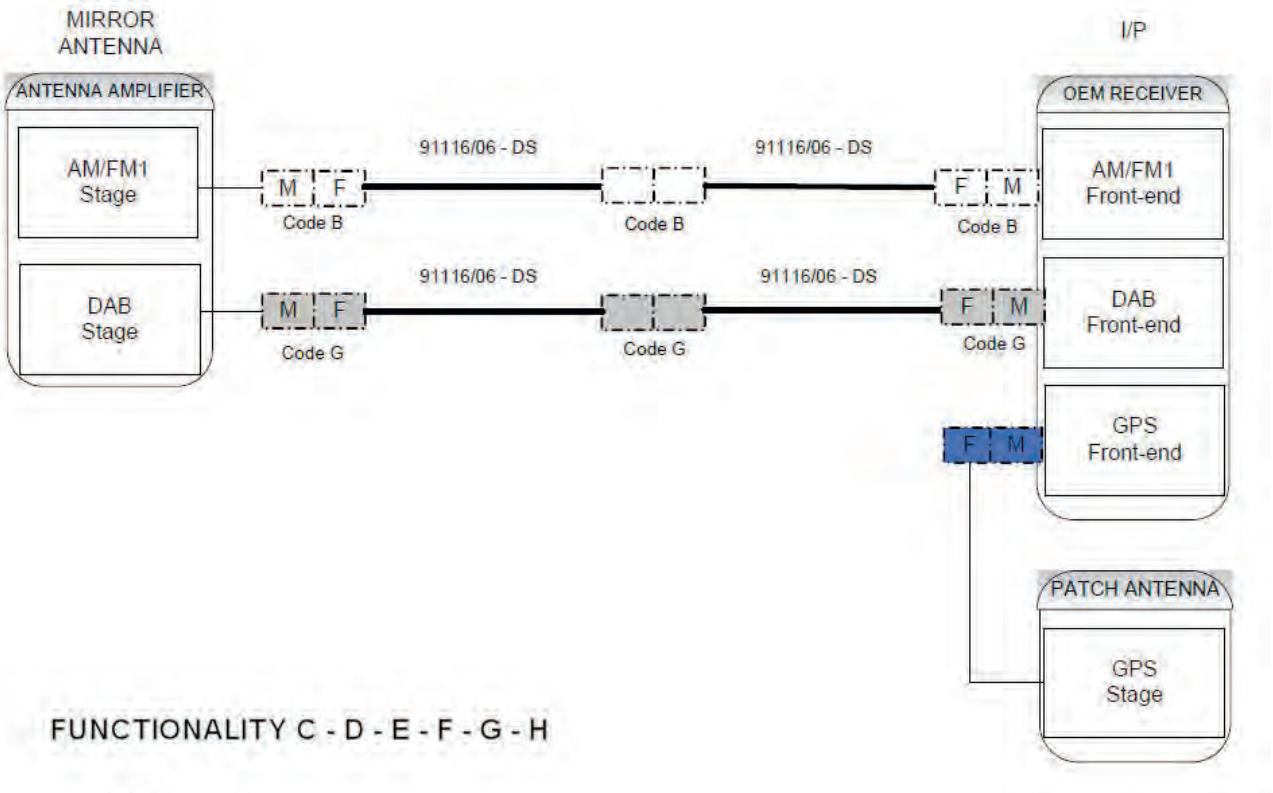
FUNCTIONALITY C - E- G



FUNCTIONALITY D - F - H



FUNCTIONALITY B



FUNCTIONALITY C - D - E - F - G - H

FAKRA antenna connectors

Polarizzazione *Coding*	Colore *Color*	Part Number Fornitore *Supplier Part Number*
Z *Z*	Azzurro *Light blue*	59Z113-000-Z
A *A*	Nero *Black*	59Z113-000-A
B *B*	Bianco *White*	59Z113-000-B
C *C*	Blu *Blue*	59Z113-000-C
F *F*	Marrone *Brown*	59Z113-000-F
G *G*	Grigio *Grey*	59Z113-000-G

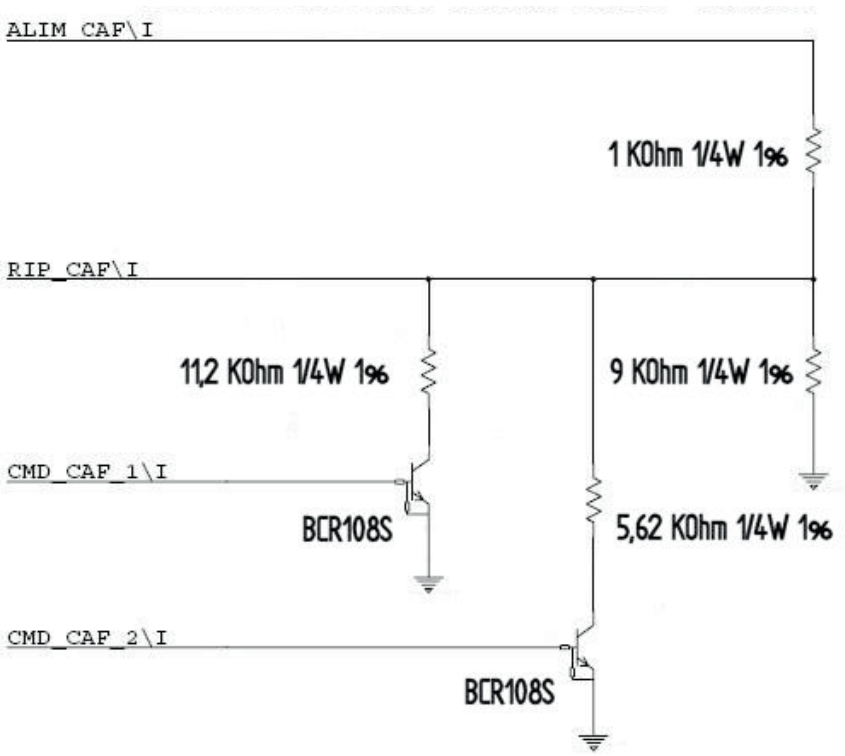
Pin	Function/ Connector Part number	Notes
	Shielded connector ASK p/n COMA Y050PA Counterpart: ASK p/n COFE (by upfitter)	
1	AM/FM radio aerial signal	AM/FM aerial on roof or in door mirror

Phantom Box

TBD

Headlight Alignment Corrector

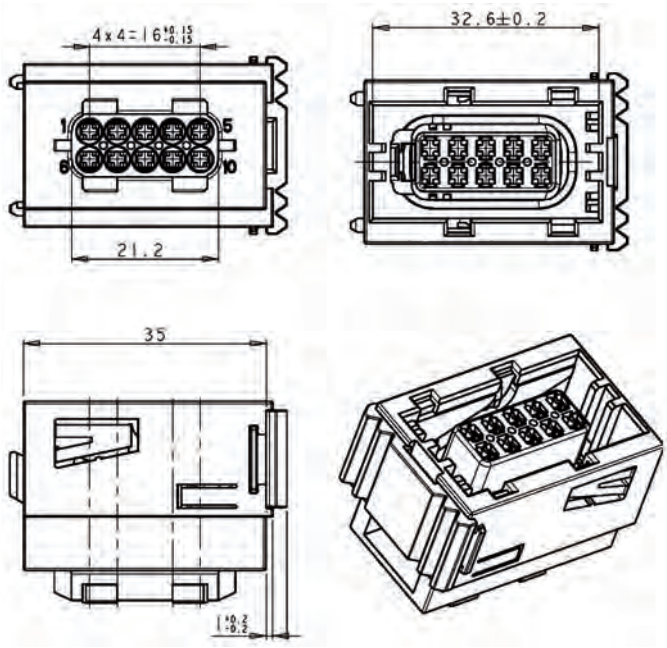
The resistance coding of the Headlight Alignment Corrector (CAF) of Ducato is as follows:



Consequently, it is important to ensure that the headlights use the same resistance coding.

GENUINE NEW DUCATO COMPONENTS
Locks
3D view of connector

Figure 47



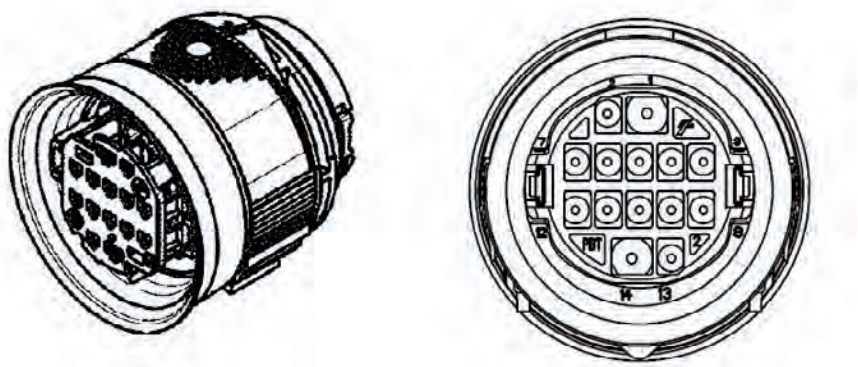
Interface connector with genuine New Ducato locks

Description of connector functions

Pin	Function/Connector part number	Minimum cable section [mm²]	Notes
	10-way Tyco connector on wiring p/n 6-1355688-1		
1	Not connected	-	
2	Lock/unlock signal from knob	0,35	CTRL_GND from FT_DRV_Door_Limit_SW
3	Switch ground	0,35	GND from FT_driver_DR_SW
4	Door open switch	0,35	CTRL_GND from FT_DRV_Door_Ajar_SW
5	Not connected	-	
6	Door lock control	1,0	Max 15A (For actuation times see tab. page 3.16)
7	Door unlock control	1,0	Max 15A (For actuation times see tab. page 3.16)
8	Dead-lock power	1,0	
9	Not connected	-	
10	Not connected	-	

Front lights
2D and 3D view of connector

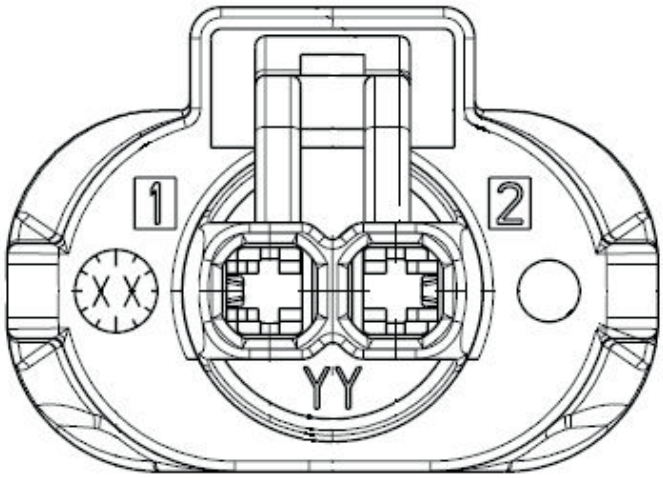
Figure 48



Description of connector functions

Pin	Operation/Part number Connector	Minimum cross-section area wire [mm²]	Wire colour (LH headlight)	Wire colour (RH headlight)
	14-pin connector Fiat code Fiat 1/05285/87 tb 91349/40 (Fci 17261405B)			
1	Dipped beam supply	0,5	VN	VB
2	Turn lights supply	0,35	LB	LN
3	-	-		
4	Parking lights supply	0,35	GV	GH
5	DRL supply form driver #1	0,35	LG	LG
6	Dipped beam signal for levelling	0,35	BC	BC
7	-	-		
8	-	-		
9	DRL supply form driver	0,5	VG	VG
10	Ground	0,5	NV	NV
11	Headlight levelling signal	0,35	CB	LG
12	-	-		
13	Main beam supply	0,5	HN	H
14	Ground	1,5	N	N

1.23 Fog lights



Pin	Operation/Part number Connector	Wire cross-section area [mm²]	Wire colour LH	Wire colour RH
	Connector 2 v. p/n 1/11039/97 Tab.91337/55 FCI240PC023S4019			
1	Supply	0,75	MN	MR
2	Earth	0,75	NZ	NZ

Connessione fendinebbia

Collegando fendinebbia di tipo diverso da quelli di produzione, e di conseguenza non utilizzando i cavi paraurti previsti di produzione per alimentare correttamente la funzione DRL nel proiettore principale (ove presente) occorre ponticellare i pin 3-4 tra di loro nel connettore di collegamento briglia fendinebbia presente sul cavo anteriore, come da schema seguente.

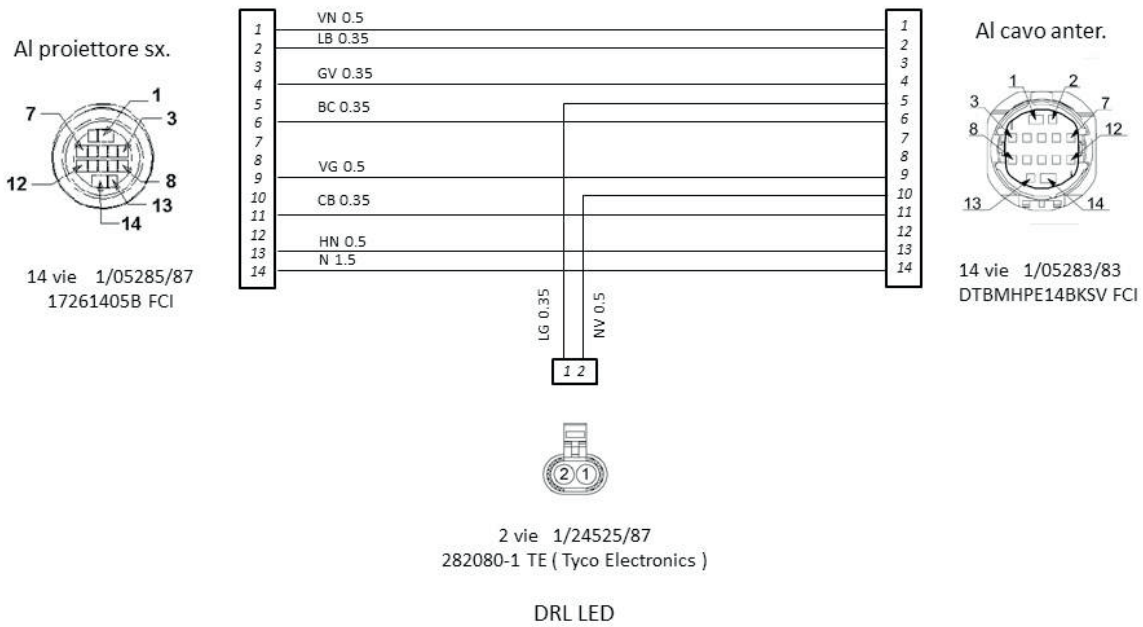
Pin out
1 – Positivo Fendinebbia
2 – Negativo Fendinebbia
3 – Ponticello DRL con pin 4
4 – Ponticello DRL con pin 3

DA TRADURRE IN INGLESE

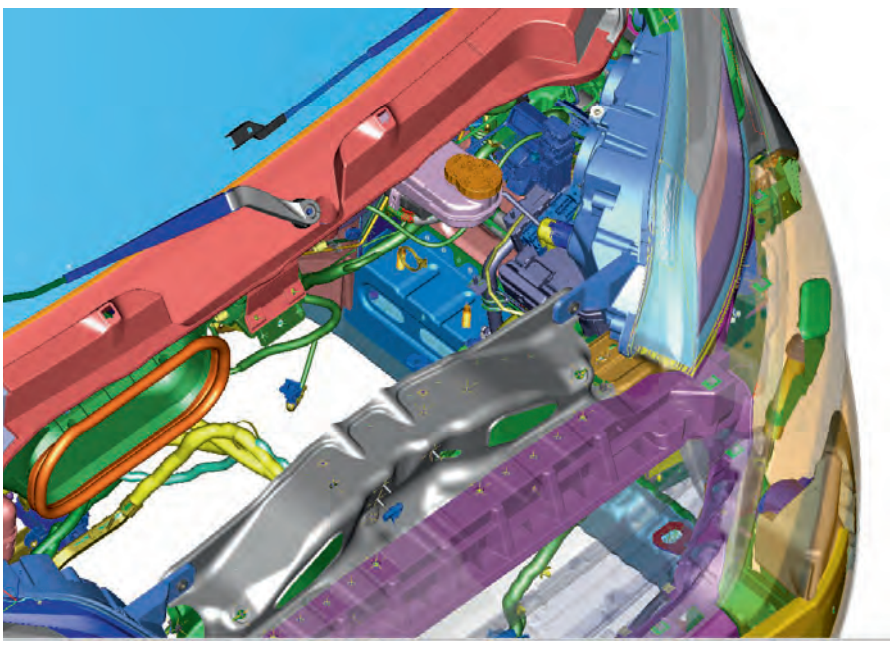
DA TRADURRE IN INGLESE

1.1 Aftermarket LED DRL System configuration

Luci DRL a LED di terze parti possono venire installate in alternativa a quelle originali escludendo queste e deviandone l'alimentazione per alimentare i nuovi gruppi ottici. Tale circuitazione viene realizzata con l'inserzione della briglia sotto indicata che viene fornita di primo impianto richiedendo l' Opt. 75N (schema briglia in allegato). L'omologazione è a carico del carrozziere.

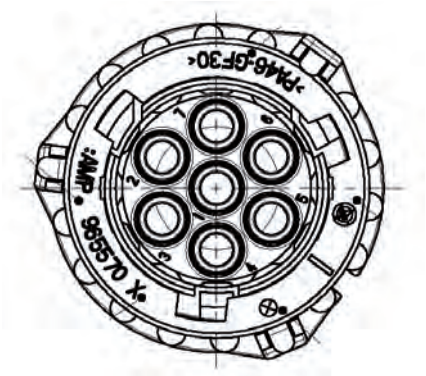


DRL LED



1.25 Taillights for chassis-cabs/cowls 2D view of connector

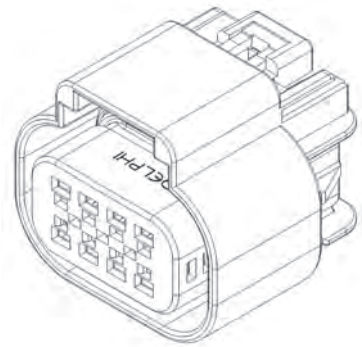
Figure 49

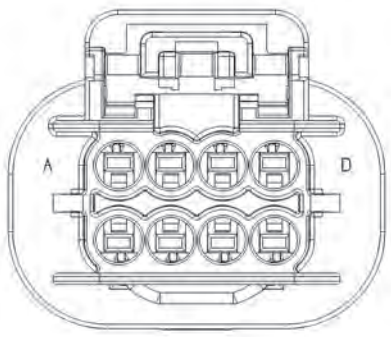


6.4.2 Description of connector functions

Pin	Function/Connector part number		Notes
	LH light – 7-way Tyco connector on wiring p/n 967650-1		
1	Bulb ground	1	
2	Rear fog warning light	0,5	
3	Stop light	0,5	
4	Direction indicator	0,5	
5	Not connected	-	
6	Side marker light	0,5	
7	Not connected	-	
	RH light – 7-way Tyco connector p/n 967650-1		
1	Bulb ground	1	
2	Not connected	-	
3	Stop light	0,5	
4	Direction indicator	0,5	
5	Reversing light	1	
6	Side marker light	0,5	
7	Not connected	-	

Taillights for vans
2D view of connector





Pin	Function / Connector part number	Colour	Minimum cable section [mm²]	Notes
	LH lighting cluster – 8-pin DELPHI 13545280 connector			
A	Parking light	GV	0,35	
B	Stop	VN	0,5	
C	Turn light	LB	0,5	
D	Not connected			
E	Not connected			
F	Fog light	MN	0,5	
G	Reverse light	BV	1	
H	Ground	N	1	
	RH lighting cluster – 8-pin DELPHI 13545280 connector			
A	Parking light	GV	0,35	
B	Stop	VN	0,5	
C	Turn light	LB	0,5	
D	Not connected			
E	Not connected			
F	Fog light	MN	0,5	
G	Reverse light	BV	1	
H	Ground	N	1	

Windscreen wiper
3D view of connector on windshield wiper motor

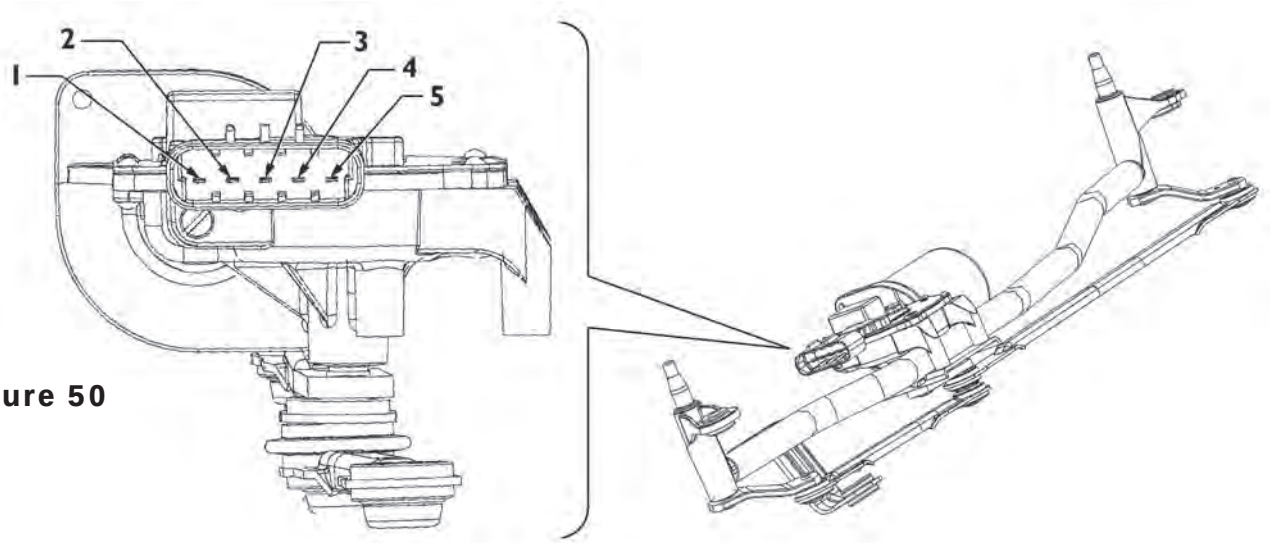
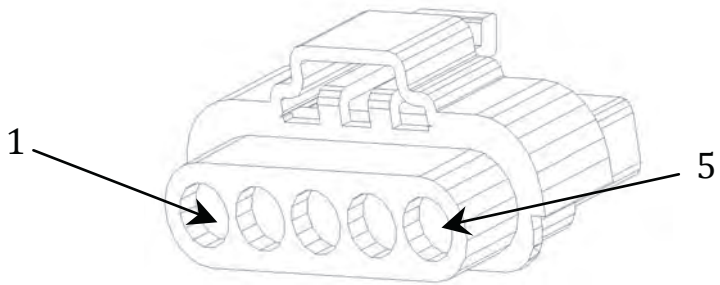


Figure 50

3D view of connector on wiring

Figure 51



Description of connector functions

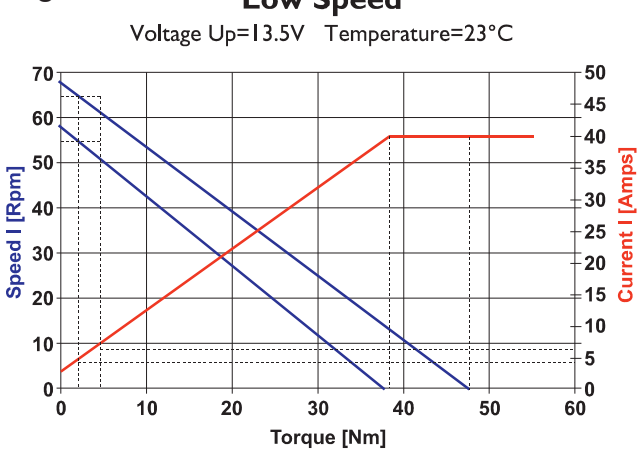
Pin	Function/Connector part number	Minimum cable section [mm²]	Notes
	5-way Delphi connector p/n 15342484	-	Riferimento a schema M012AA
1	Ground	2,5	
2	Power supply	2,5	
3	Speed selector	0,35	
4	On/off	0,35	
5	Parking contact	0,35	

Windscreen wiper motor specifications

Nominal voltage	12V
Working voltage	9 - 16V
Intermittence	10 - 18
Number of cycles (speed I)	45 ± 5
Number of cycles (speed II)	65 ± 5

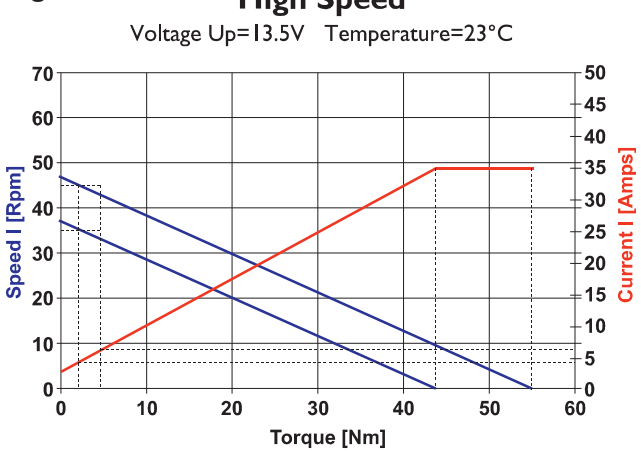
NOTE: In case of windscreen wiper group installation, the converter has to fit a group with the same electrical specifications as the original Fiat Chrysler Automobiles S.p.A. group.

Figure 52



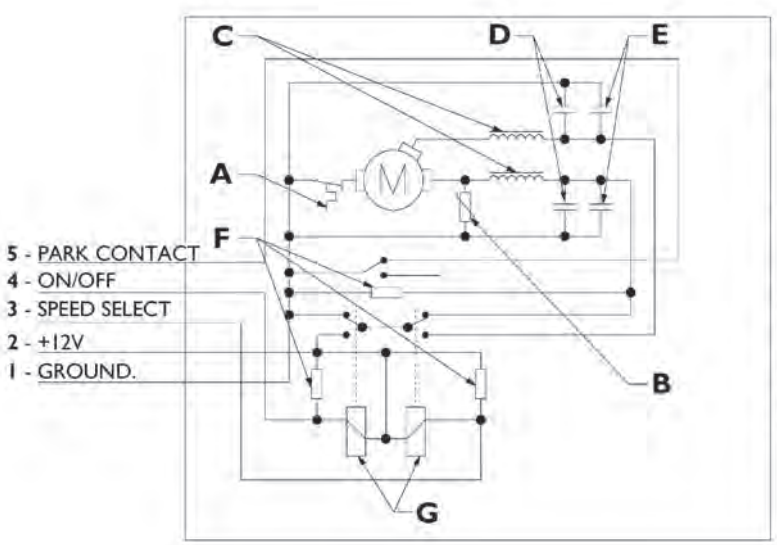
Torque [Nm]	Speed [RPM]	Current [A]
2	60±5	<4.5
5	>50	<6.5
34.7-44.5	5	<40
38-48	0	<40

Figure 53



Torque [Nm]	Speed [RPM]	Current [A]
2	40±5	<3
5	>30	<5
38.9-49.1	5	<35
45-55	0	<35

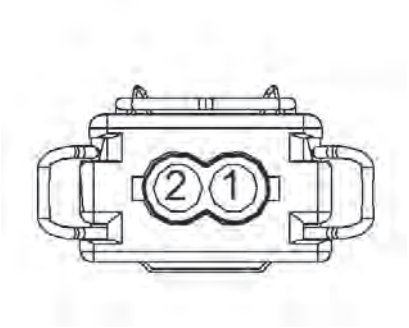
Figure 54



A - THERMAL PROTECTION
TYPE 6AP00720W
(TEXAS INSTRUMENT)
B - VARISTOR SEN 270 KD 07
Vac = 17V
Vdc = 22V
V2.5A = 53V
ENERGIE = 1J/1 impulse
C=2200 pF
C - CHOKE:
NOMINAL VOLTAGE: UP TO 60V
NOMINAL CURRENT: 6A
INDUCTION: 5.7±10% microH
D - CAPACITOR CF1,
5 microaF/63V
E - CERAMIC CAPACITOR
2n2/100V Z5U
F - RESISTOR
500 Ohm/0.5W
G - RELAY FBR512ND12W1
NOMINAL VOLTAGE: 12V(DC)
COIL RESISTANCE (±10% AT 20°C): 240 Ohm
MUST OPERATE VOLTAGE:
7.3V (DC) AT 20°C, 9.2V (DC) AT 85°C
THERMAL RESITANCE: 73° C/W

Windscreen washer pump
2D view of connector

Figura 55

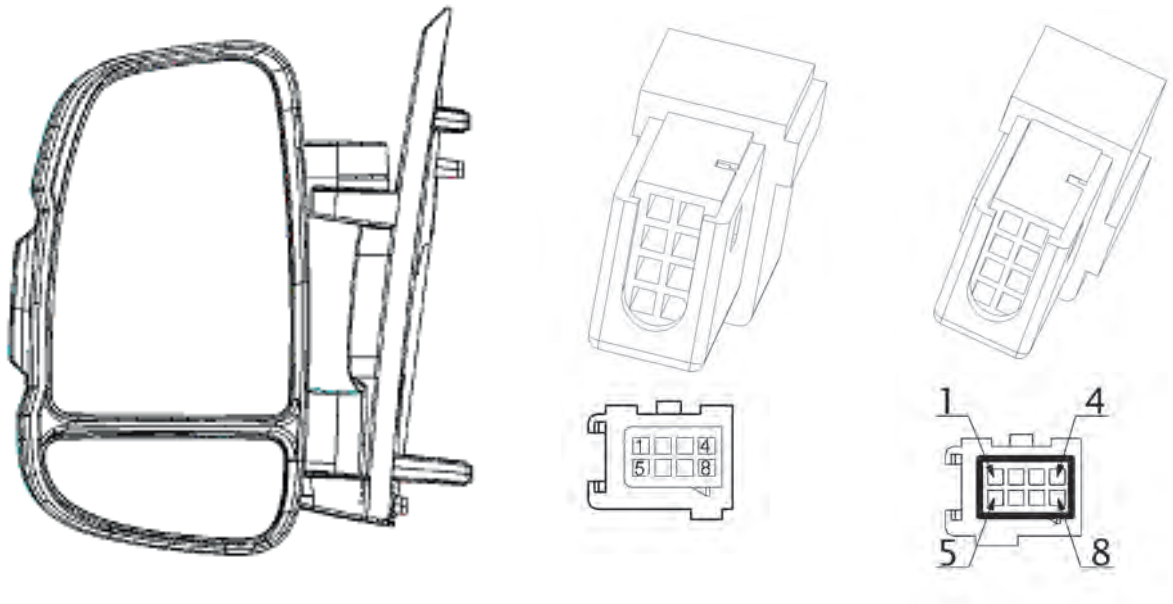


Description of connector functions

Pin	Function/Connector part number	Minimum cable section [mm²]	Notes
	2-way Delphi connector on wiring p/n 12185025 (401589)	-	
1	Power supply	1,5	
2	Ground	1,5	

Left hand external rear view mirror
3D view of connectors

Figure 56



NOTE: The figure shows the counter-connectors.

Description of connector functions

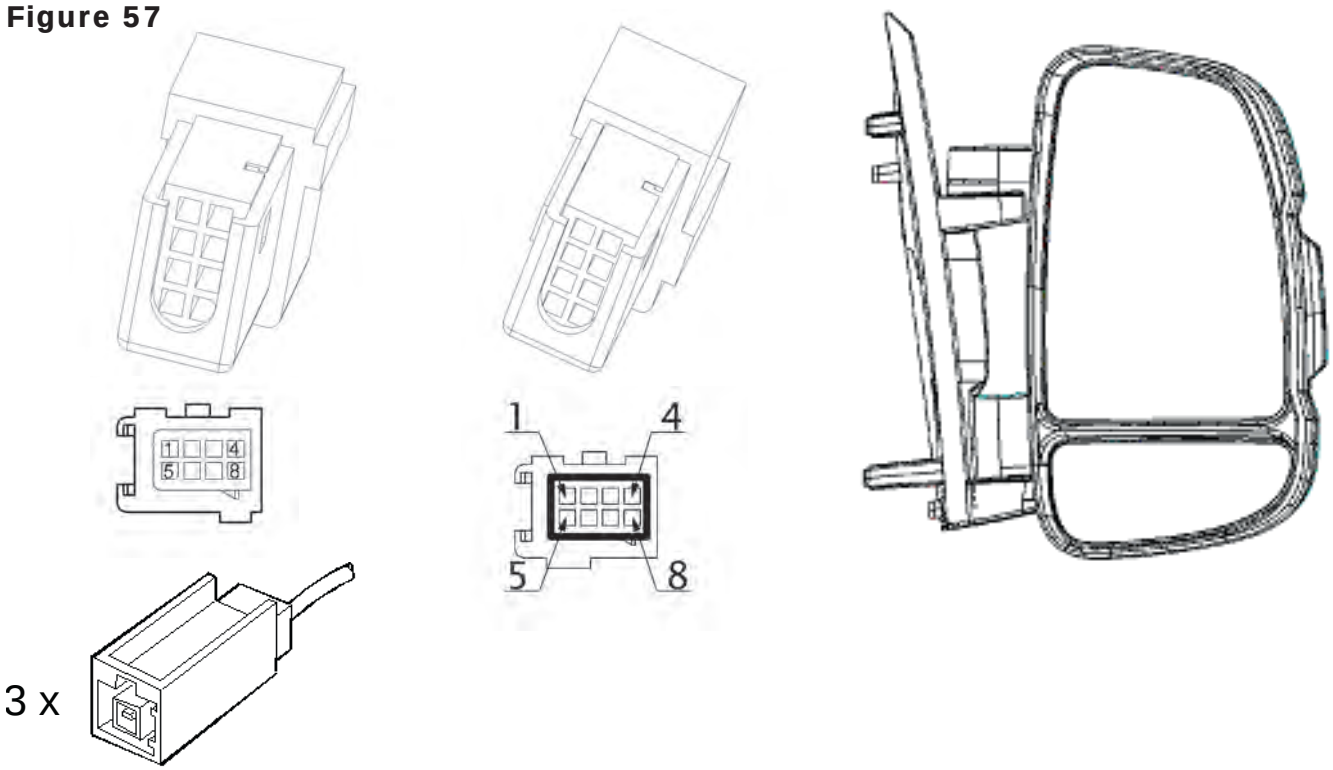
Pin	Function / Connector part number	Minimum cable section [mm²]	Notes
	8-way Tyco connector on mirror p/n 1745000-1 Counterpart: Tyco p/n 284869-1		BLACK colour
1	Direction indicator power supply	0,5	1 16W - 12V bulb
2	Direction indicator and defroster ground	0,75	
3	Main mirror servo right/left control	0,5	
4	Main mirror servo up/down control	0,5	
5	Auxiliary mirror servo right/left control	0,5	
6	Auxiliary mirror servo up/down control	0,5	
7	Mirror servos common connection	0,5	
8	Defroster power supply	0,75	

Pin	Function/Connector part number	Minimum cable section [mm²]	Notes
	8-way Tyco connector on mirror p/n 1745000-2 Counterpart: Tyco p/n 284869-2		GREY colour
1	External temperature sensor (ref)	0,5	-
2	External temperature sensor (signal)	0,5	-
3	Deflector servo control	0,5	-
4	Deflector servo ground	0,5	-
5	Not connected	-	-
6	Not connected	-	-
7	Not connected	-	-
8	Not connected	-	-

NOTE: if Fiat Chrysler Automobiles S.p.A. rear view mirrors are used, refer to the connections described in the preceding paragraphs of this document.

Right hand external rear-view mirror
3D view of connectors

Figure 57



NOTE: The figure shows the connector counterparts.

Description of connector functions

Pin	Function/Connector part number	Minimum cable section [mm²]	Notes
	8-way Tyco connector on mirror p/n 1745000-1 Counterpart: Tyco p/n 284869-1		BLACK colour
1	Direction indicator power supply.	0,5	1 Lampada da 16W - 12V
2	Direction indicator and defroster ground	0,75	
3	Main mirror servo left/right control	0,5	
4	Main mirror servo up/down control	0,5	
5	Auxiliary mirror servo left/right control	0,5	
6	Auxiliary mirror servo up/down control	0,5	
7	Mirror servos common connection	0,5	
8	Defroster power supply	0,75	
	8-way Tyco connector on mirror p/n 1745000-2 Counterpart: Tyco p/n 284869-2		GREY colour
1	Radio aerial power supply	0,5	
2	Not connected	-	
3	Deflector servo control	0,5	
4	Deflector servo ground	0,5	
5	Not connected	-	
6	Not connected	-	
7	Not connected	-	
8	Not connected	-	

NOTE: if Fiat Chrysler Automobiles S.p.A. rear view mirrors are used, refer to the connections described in the preceding paragraphs of this document.

Ceiling light
2D view of connector

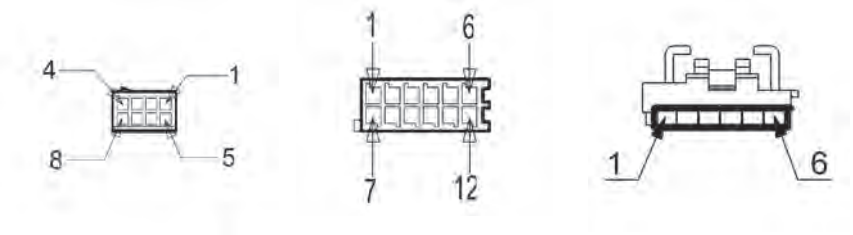
Figure 58

Description of connector functions

Pin	Function/Connector part number	Minimum cable section [mm²]	Notes
	3-way Tyco connector on wiring p/n 282627-1	-	
1	Bulb ground	0,5	
2	Power supply +30 (SBMT)	0,5	
3	Negative control	0,5	

Driver's side door control pad
2D view of connectors

Figure 59

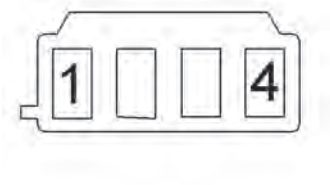


Description of connector functions

Pin	Operation/Part number Connector	Wire cross-section area [mm²]	Wire colour LHD	Wire colour RHD
	8-way connector p/n Tyco 1/08807/97	-		
1	not connected	0,35	HN	HV
2	not connected	0,35	BH	BH
3	Earth	0,35	NZ	NZ
4	not connected	0,35	SZ	SZ
5	LH electric window up/down control	0,35	HM	HR
6	LH electric window enablement control	0,35	BL	BL
7	not connected	0,35	HR	HM
8	RH electric window up/down control	0,35	HV	HN
	12-way connector p/n 1/08402/07 Tab. 91300 (Tyco 1534100 Cover 1534093)	-		
1	Earth	0,5	N	N
2	RH main mirror UP/DOWN	0,35	MN	BH
3	LH secondary mirror LH/RH	0,35	SZ	BV
4	LH main mirror LH/RH	0,35	HM	BR
5	Power supply/lighting	0,5	BL	BL
6	LH secondary mirror up/down	0,35	SV	BZ
7	Supply	0,5	BL	BL
8	Mirror motor common	0,35	HN	HN
9	LH main mirror up/down	0,35	BH	MN
10	RH secondary mirror LH/RH	0,35	BV	SZ
11	RH secondary mirror up/down	0,35	BZ	SV
12	RH main mirror LH/RH	0,35	BR	HM
	6 pin connector p/n Tyco 284802-1	-		
1	Earth	0,75	NS	NS
2	RH mirror folding motor control	0,75	HM	HM
3	RH mirror folding motor earth	0,5	N	N
4	LH mirror folding motor positive control	0,5	NZ	NZ
5	LH mirror folding motor earth	0,5	HB	HB
6	Supply	0,5	BL	BL

Passenger side door control pad
2D view of connector

Figure 60

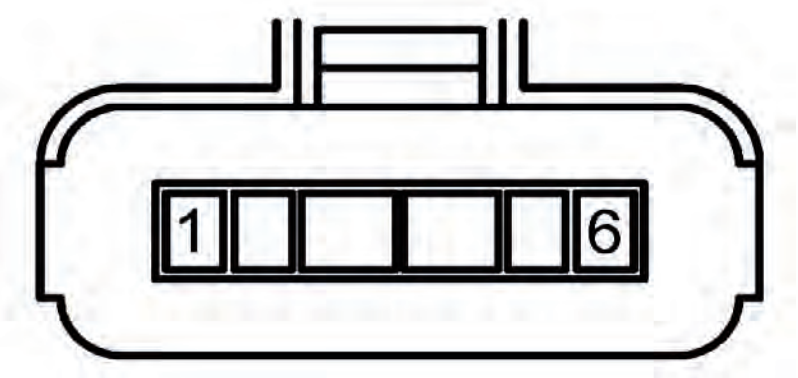


Description of connector functions

Pin	Operation/Part number Connector	Wire cross-section area [mm²]	Wire colour
	4-way connector 1/08332/07 Tab. 91353		
1	Passenger's side window down control	0,35	HR
2	Supply/lighting	0,35	BL
3	Earth	0,35	NZ
4	Passenger's side window up control	0,35	HV

Electric windows
2D view of connector

Figure 61

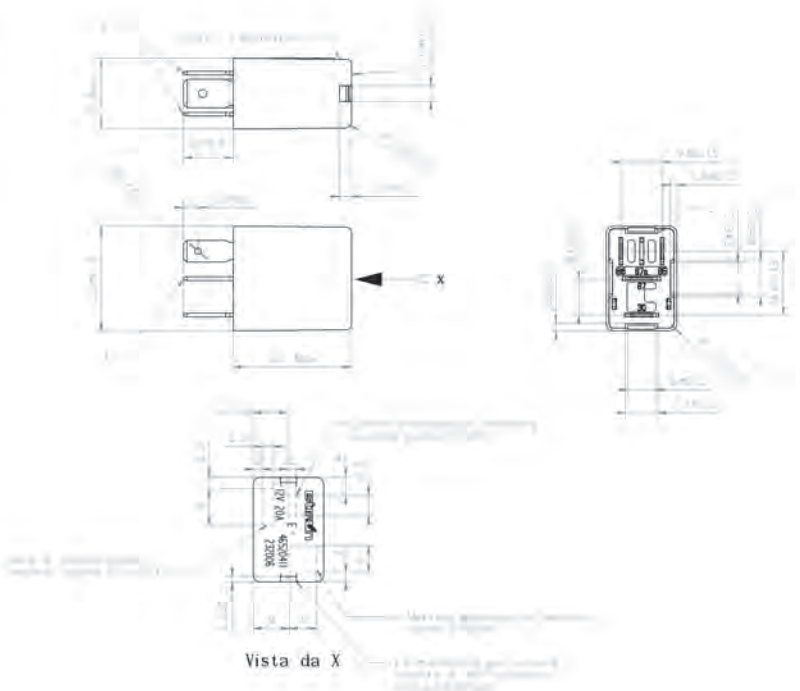


Description of connector functions

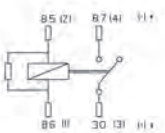
Pin	Operation/Part number Connector	Wire cross-section area [mm²]	Wire colour
	6-way connector p/n 1/01538/97 Tab. 91337/45		
1	-	-	-
2	-	-	-
3	Window up supply	1,5	R
4	Window down supply	1,5	NZ
5	-	-	-
6	-	-	-

Standard Fiat Chrysler Automobiles S.p.A. Component drawings
20a micro relay switch

DATI CARATTERISTICI	
TENSIONE NOMINALE	12V
CORRENTE NOMINALE A 80°C	20A
PROTEZIONE AMBIENTALE (IP) NORMA IEC 529	IP 54
TEMPERATURA DI ESERCIZIO TMIN/TMAX	-40°C/125°C
AFFIDABILITA' A 0 KM	20PPM
DISPOSITIVO PARALLELO 85/86	680 Ohm
RESISTENZA EQUIVALENTE 85/86 A 23°C	73±5 Ohm
MAX INDUTTANZA BOBINA	24 mH
MIN TENSIONE DI SCARICA	1000 V/1'
MIN RESISTENZA DI ISOLAMENTO	10 M Ohm
CADUTA DI TENSIONE 30/87 A 23°C A NUOVO	MAX 3mV/A
MAX TENSIONE INDUTTIVA RILASCIO	110V
MAX CORRENTE IN CHIUSURA 87	110V
MAX CORRENTE IN APERTURA 87	20A
MAX CORRENTE CONTINUATIVA 87 A 23°C	20A
MAX CORRENTE CONTINUATIVA 87 A TMAX	20A
MAX SOVRATEMPERATURA TERMINALE 30	40°C
MAX TENSIONE CHIUSURA MAGNETICA A 23°C	7.5V
MAX TENSIONE CHIUSURA MAGNETICA A TMAX	9.6V
MIN TENSIONE DI RILASCIO A 23°C	2V
MIN TENSIONE DI RILASCIO A TMAX	2V
MAX TEMPO DI RIMBALZO 87	100 micr. s.
TEMPO DI CHIUSURA MIN/MAX 87	4/6 ms
TEMPO DI APERTURA MIN/MAX 87	6/8 ms



SCHEMA ELETTRICO



*: POLARITA' CONSIGLIATA

TABELLA DEI MATERIALI

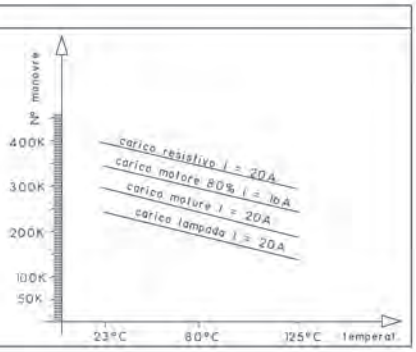
	DENOMINAZIONE	MATERIALE			TRATTAMENTO	
		TABELLA	SIGLA	CLASSE	SIGLA	CAPITOL.
1	COPERCHIO COLORE NERO	55235	PE 60.30	PLASTICI *		
2	BASAMENTO COLORE NERO	55235	PE 60.30	PLASTICI *		
3	SPINE LAMELLARI SECONDO NORMA FIAT 91319 6.3 X 0.8		Cu ETP	LEGHE METALL.	Superf. Ag	
4	SPINE LAMELLARI SECONDO NORMA FIAT 91319 4.8 X 0.8	53441	POT 67 LMT H10	LEGHE METALL.	Cu/Sn/A	9.57422

*) Raggi non quotati +-0.5

PRESTAZIONI

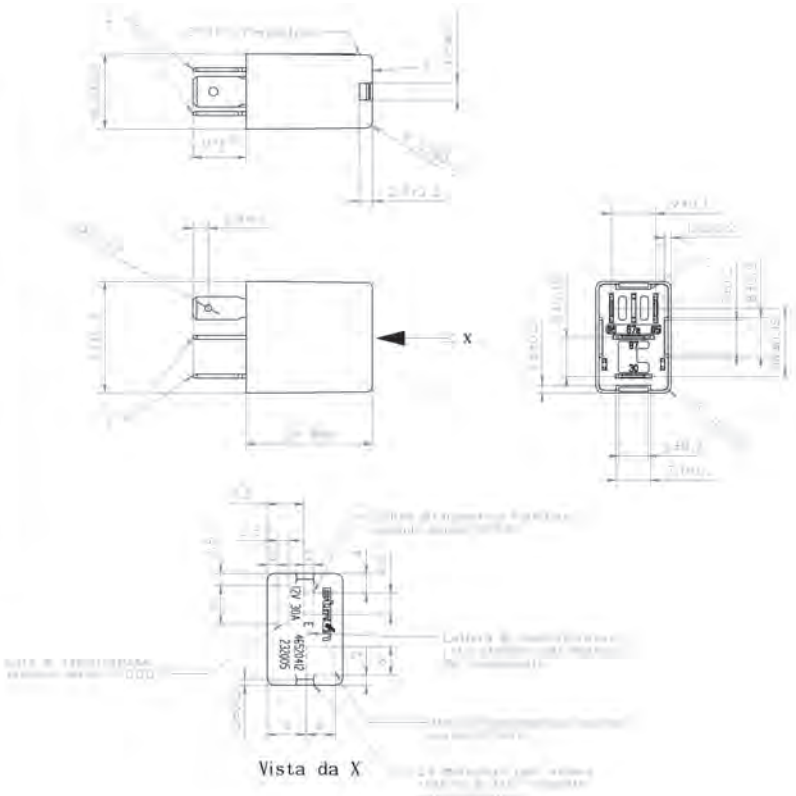
NUMERO DI MANOVRE
IN FUNZIONE DELLA TEMPERATURA E DEL CARICO

TIPOLOGIA CARICO	I	23° C	80° C	125° C
RESISTIVO	20A	400K	350K	300K
MOTORE = I NOMIN. CONTINUA A 80°C	20A	300K	250K	200K
MOTORE = 80% I NOMIN.	16A	350K	300K	250K
LAMPADA	20A	250K	200K	150K

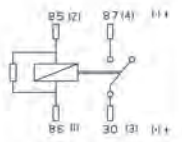


1.36 30A micro relay switch

DATI CARATTERISTICI	
TENSIONE NOMINALE	12V
CORRENTE NOMINALE A 80°C	30A
PROTEZIONE AMBIENTALE (IP) NORMA IEC 529	IP 54
TEMPERATURA DI ESERCIZIO TMIN/TMAX	-40°C/125°C
AFFIDABILITA' A 0 KM	20PPM
DISPOSITIVO PARALLELO 85/86	680 Ohm
RESISTENZA EQUIVALENTE 85/86 A 23°C	73±5 Ohm
MAX INDUTTANZA BOBINA	24 mH
MIN TENSIONE DI SCARICA	1000 V/1'
MIN RESISTENZA DI ISOLAMENTO	10 M Ohm
CADUTA DI TENSIONE 30/87 A 23°C A NUOVO	MAX 3mV/A
MAX TENSIONE INDUTTIVA RILASCIO	110V
MAX CORRENTE IN CHIUSURA 87	165A
MAX CORRENTE IN APERTURA 87	30A
MAX CORRENTE CONTINUATIVA 87 A 23°C	30A
MAX CORRENTE CONTINUATIVA 87 A TMAX	30A
MAX SOVRATEMPERATURA TERMINALE 30	40°C
MAX TENSIONE CHIUSURA MAGNETICA A 23°C	7.5V
MAX TENSIONE CHIUSURA MAGNETICA A TMAX	9.6V
MIN TENSIONE DI RILASCIO A 23°C	2V
MIN TENSIONE DI RILASCIO A TMAX	2V
MAX TEMPO DI RIMBALZO 87	100 micr. s.
TEMPO DI CHIUSURA MIN/MAX 87	4/6 ms
TEMPO DI APERTURA MIN/MAX 87	6/8 ms



SCHEMA ELETTRICO



*) POLARITA' CONSIGLIATA

TABELLA DEI MATERIALI

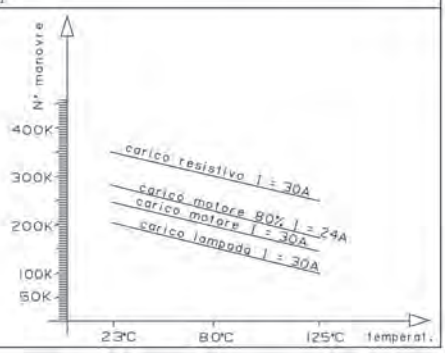
	DENOMINAZIONE	MATERIALE			TRATTAMENTO	
		TABELLA	SIGLA	CLASSE	SIGLA	CAPITOL.
1	COPERCHIO COLORE ROSSO	55235	PE 60.30	PLASTICI *		
2	BASAMENTO COLORE NERO	55235	PE 60.30	PLASTICI *		
3	SPINE LAMELLARI SECONDO NORMA FIAT 91319 6.3 X 0.8		Cu ETP	LEGHE METALL.	Superf. Ag	
4	SPINE LAMELLARI SECONDO NORMA FIAT 91319 4.8 X 0.8	53441	POT 67 LMT H10	LEGHE METALL.	Cu/Sn/A.	9.57422

*) Raggi non quotati +- 0.5

PRESTAZIONI

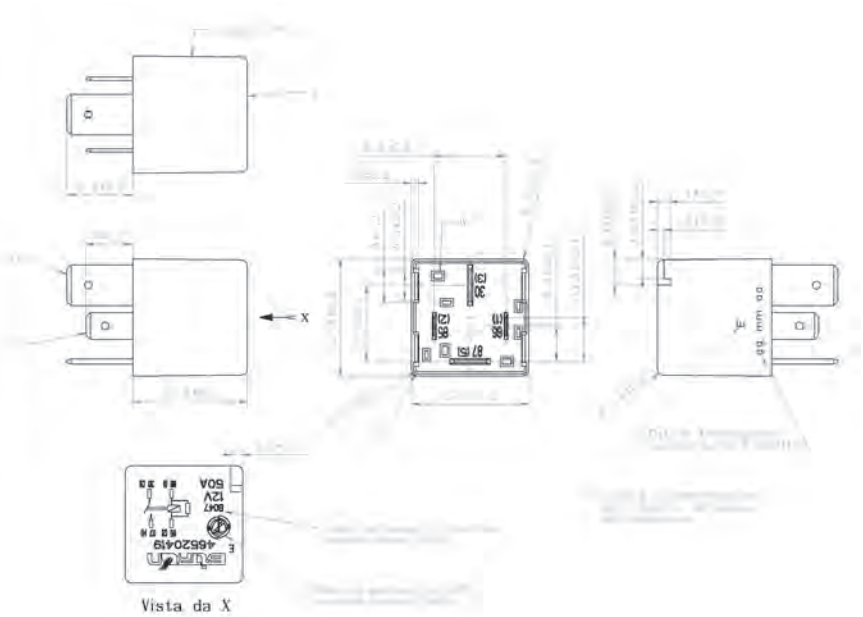
NUMERO DI MANOVRE
IN FUNZIONE DELLA TEMPERATURA E DEL CARICO

TIPOLOGIA CARICO	I	23°C	80°C	125°C
RESISTIVO	30A	350K	300K	250K
MOTORE : I NOMIN. CONTINUA A 80°C	30A	250K	200K	150K
MOTORE : 80% I NOMIN.	24A	270K	220K	170K
LAMPADA	30A	200K	150K	100K



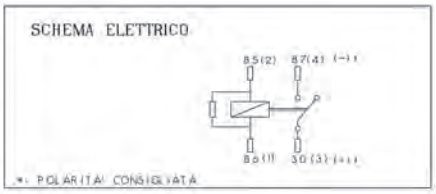
1.37 T 50A maxi relay switch

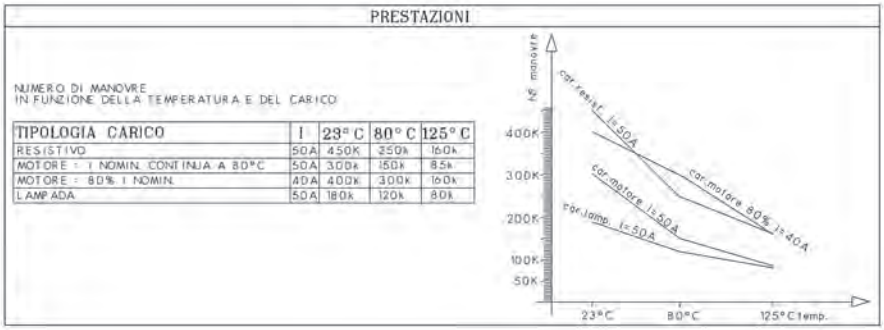
DATI CARATTERISTICI	
TENSIONE NOMINALE	12V
CORRENTE NOMINALE A 80°C	50A
PROTEZIONE AMBIENTALE (IP) NORMA IEC 529	IP 54
TEMPERATURA DI ESERCIZIO TMIN/TMAX	-40°C/125°C
AFFIDABILITA' A 0 KM	20PPM
DISPOSITIVO PARALLELO 85/86	680 Ohm
RESISTENZA EQUIVALENTE 85/86 A 23°C	75±5 Ohm
MAX INDUTTANZA BOBINA	22 mH
MIN TENSIONE DI SCARICA	1000 V/1'
MIN RESISTENZA DI ISOLAMENTO	10 M Ohm
CADUTA DI TENSIONE 30/87 A 23°C A NUOVO	MAX 3mV/A
MAX TENSIONE INDUTTIVA RILASCIO	100V
MAX CORRENTE IN CHIUSURA 87	200 A
MAX CORRENTE IN APERTURA 87	70A
MAX CORRENTE CONTINUATIVA 87 A 23°C	70A
MAX CORRENTE CONTINUATIVA 87 A TMAX	50A
MAX SOVRATEMPERATURA TERMINALE 30	40°C
MAX TENSIONE CHIUSURA MAGNETICA A 23°C	7.5V
MAX TENSIONE CHIUSURA MAGNETICA A TMAX	9.6V
MIN TENSIONE DI RILASCIO A 23°C	2V
MIN TENSIONE DI RILASCIO A TMAX	2V
MAX TEMPO DI RIMBALZO 87	80 micr. s.
TEMPO DI CHIUSURA MIN/MAX 87	4/6 ms
TEMPO DI APERTURA MIN/MAX 87	4/8 ms



Vista da X

TABELLA DEI MATERIALI						
	DENOMINAZIONE	MATERIALE			TRATTAMENTO	
		TABELLA	SIGLA	CLASSE	SIGLA	CAPITOL.
A	COPERCHIO COLORE NERO	55235	PE 60.30	PLASTICI		
B	BASAMENTO COLORE NERO	55235	PE 60.30	PLASTICI		
C	SPINE LAMELLARI SECONDO NORMA FIAT 91319 6.3 X 0.8	53441	POT 67 LMT H10	LEGHE METALL.	Cu/Sn/A	9.57422
D	SPINE LAMELLARI SECONDO NORMA FIAT 91319 9.5 X 1.2		Cu ETP	LEGHE METALL.	Superf. Ag	





Tips for installation
Refrigerator power supply

Having to power the refrigerator in parallel to the auxiliary battery charger circuit, in order to reduce voltage drop, we recommend one of the following solutions:

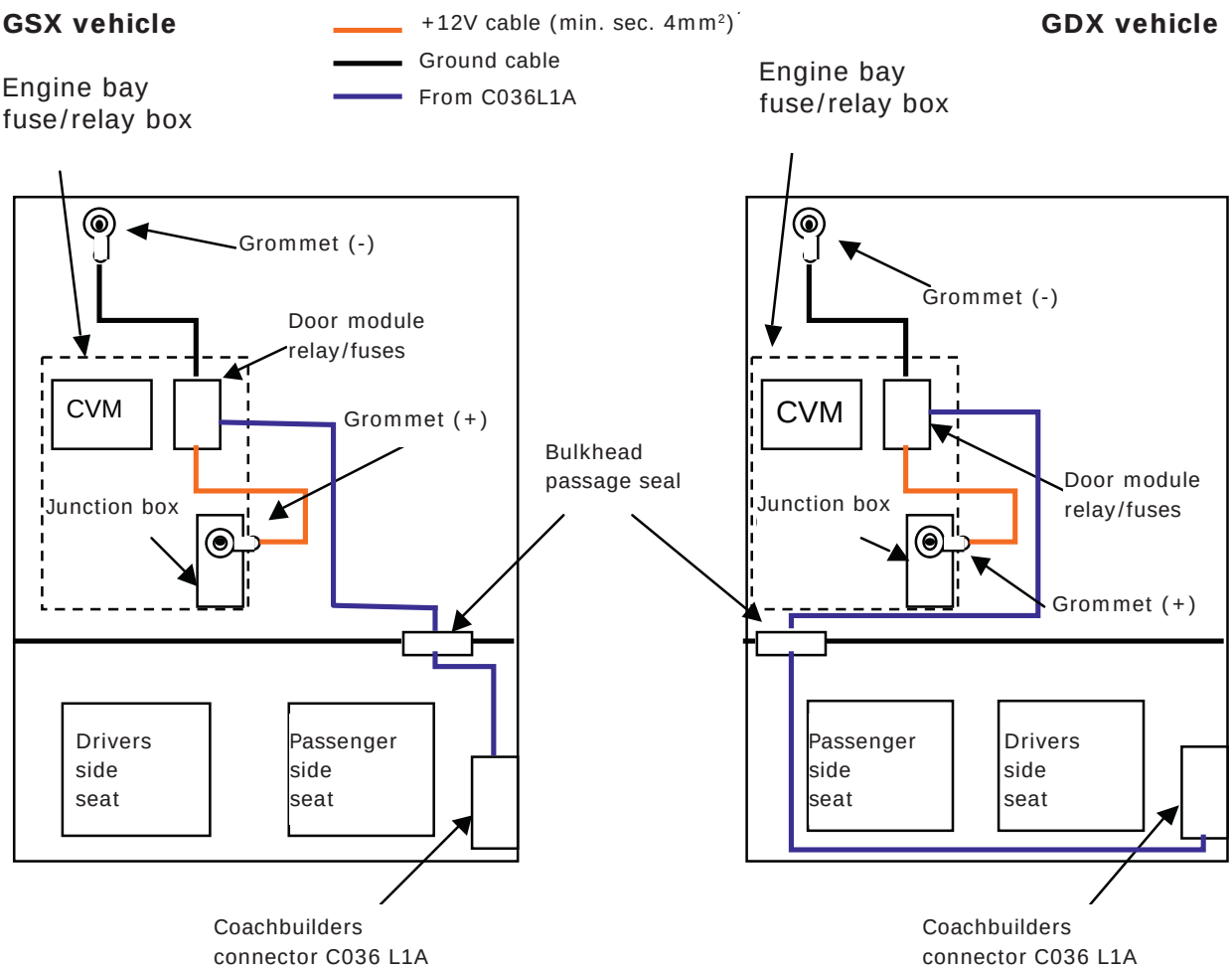
a - Double the main power supply (+30) starting from connector C036L1C with an 8mm² (for the battery) and with a 6mm² cable (for the fridge) clamped together.

b - Use a 16mm² section cable from connector C036L1C and for the entire section of common line.

In both cases it is a good idea to make the fridge negative terminal connection with a high cross-section cable that is as short as possible (using a ground point chosen between A, B, C or pin 2 of connector C036L1C).

Coachbuilders socket in engine bay

This paragraph describes the solution for arranging specific power supplies in the engine bay (for example for the Xenon lights control unit). The diagram below shows the correct layout of the additional wiring that has to be installed by the coachbuilder.



List of materials:

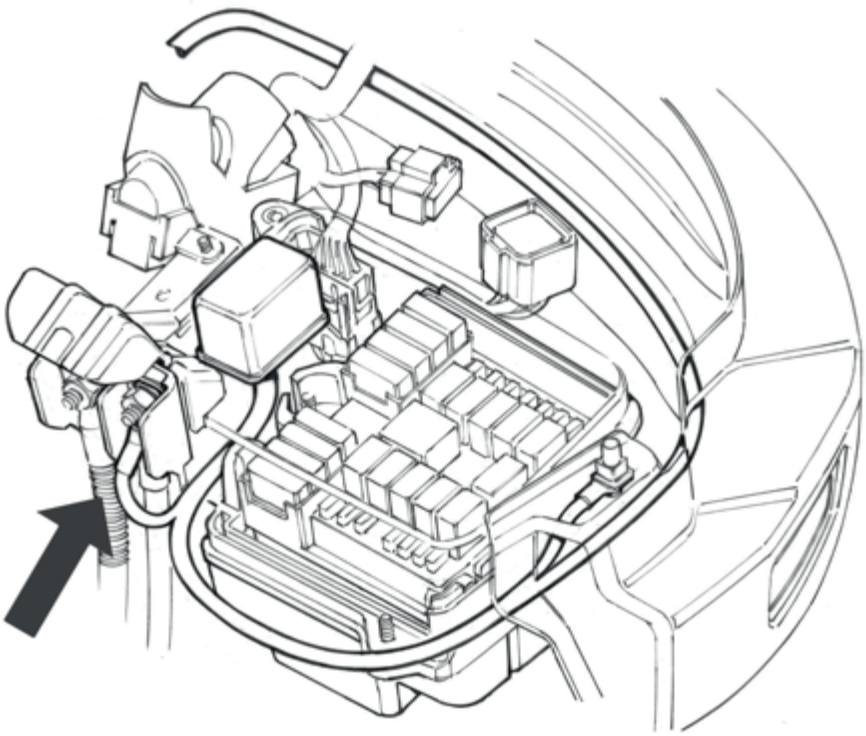
- Door module relay/fuse box: MTA p/n 03.01560
- Module mounting bracket: MTA p/n 03.00475
- Bulkhead passage seal: SUMITOMO drawing number 1334413080
- Grommet (+): MTA p/n 17.06711 (M8 hole)
- Grommet (-): M8 hole
  (for cable sections from 1 to 2.5 mm^2 recommended MTA p/n 17.06731)
- M8 nut: M8 hexagonal nut with nylon ring

Description of installation procedure:

- Remove the relay/fuse box cover in the engine bay by removing the nuts.
- Unscrew the nut from the junction box pin (see figure 62), overlay the grommet (+) on the one already present (ATTENTION, vice-versa not permitted), then re-tighten the nut to torque of 15Nm ± 10%.
- Connect the grommet (-) to the ground pin present in the frontal area (see figure 63), after which apply an M8 nut, tightening it to torque of 15Nm ± 10%.
- Insert the door module relay/fuse box in the seat in the box in the engine bay.

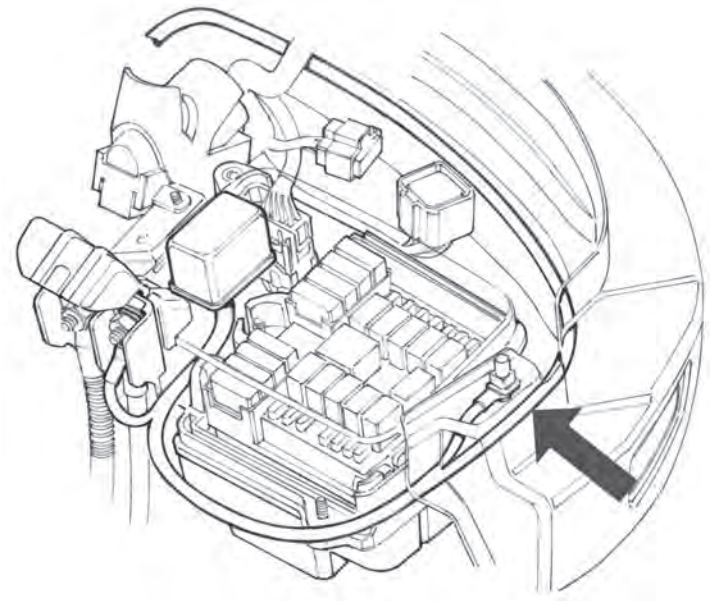
- Replace the box cover paying attention to the correct arrangement of the cables.
- Lay the cables as shown in figure 64 using the retainer clips of the main wiring harness already installed on the vehicle.
- Drill through the flame bulkhead and remove the closing plug of the passage toward the cabin.
- Fit the bulkhead seal paying attention to correctly fasten it to the sheet metal to prevent infiltration into the cabin.
- Lay the cables in the cabin following the route shown in figure 65.

Figure 62



Engine bay – CVM box and view of junction box

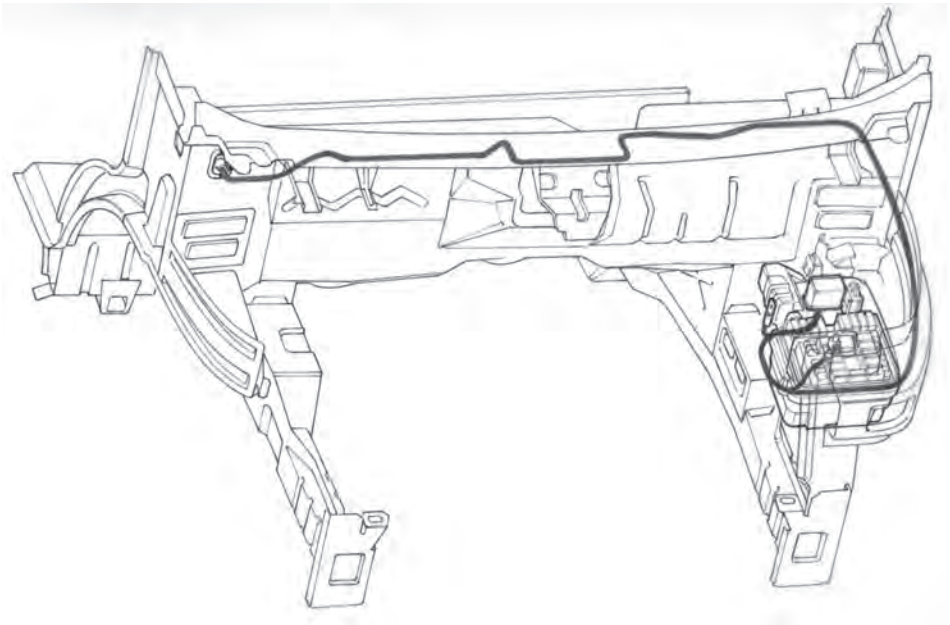
Figure 63



Engine bay – view of ground pin

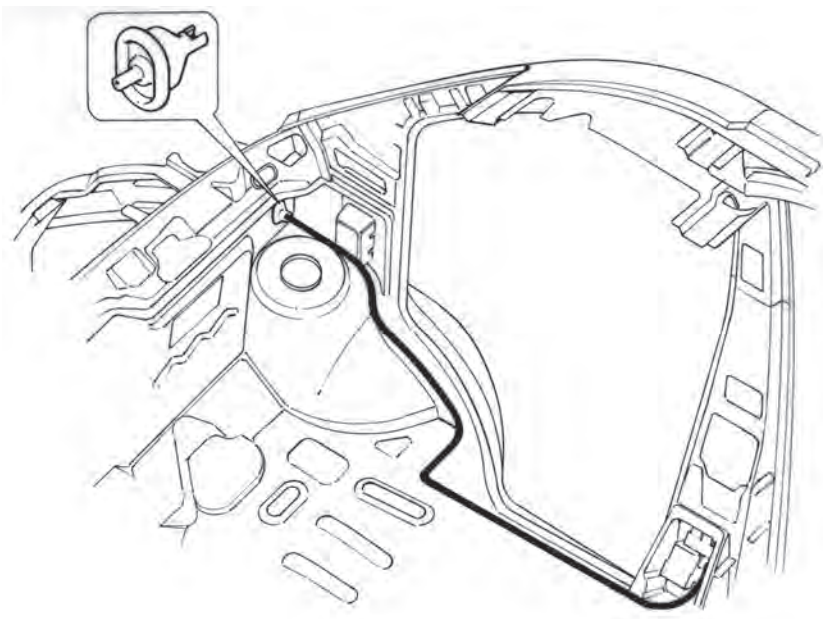
CAUTION: for emergency starter ground use a screw that allows to connect the booster cables.

Figure 64



Engine bay – front view of GSX cable layout

Figure 65



Cabin – view of GSX cable layout

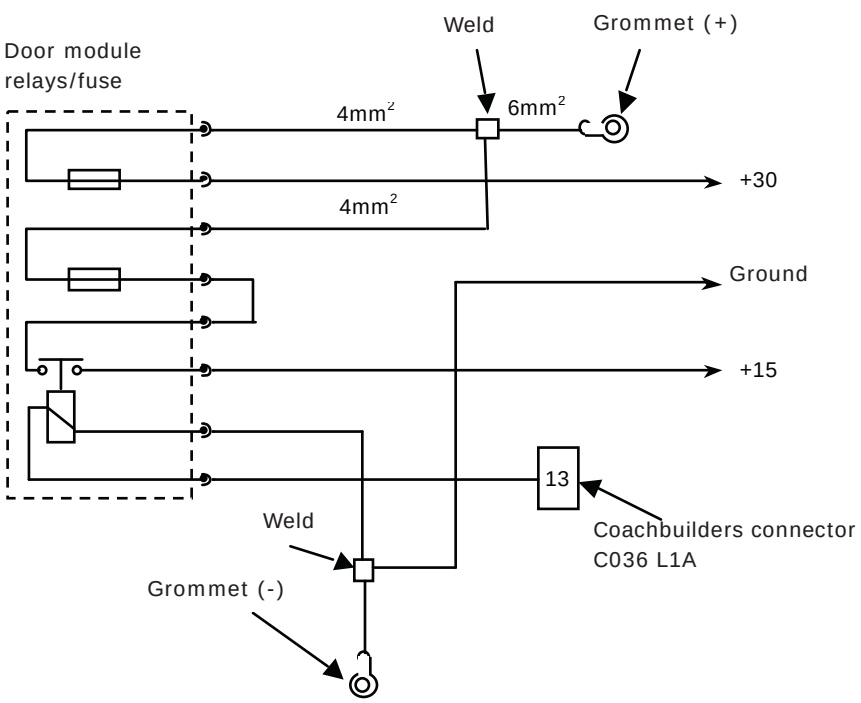
The wiring realised by the coachbuilder must be adequately protected by means of abrasion resistant tape with same performance as COROPLAST 880X o with a corrugate hose of proper section.

NOTES:

1. **The insulating material of the flame bulkhead is predisposed for drilling in the vicinity of the hole.**
2. **In vehicles equipped with chrono-tachograph, the bulkhead passage is already present. The sealing tape already present has to be removed, the cables passed along with those of the chrono-tachograph and a new sealing tape applied.**
3. **In vehicles with automatic gearbox, the relay/fuse block is already present in the CVM box, in this case to fit the additional fuses and relays it is possible to use the free positions in the block.**

Example of circuit for +30 and +15 power supplies in engine bay:

Figure 66



NOTES:

1. **The fuses must be correctly sized according to the minimum section of the protected wires.**
2. **The relays must be Fiat Chrysler Automobiles S.p.A. standard type (see chapter 7)**

Anti-theft system

If an anti-theft system has to be installed, we recommend using the original kit p/n 50926750 by the Accessories Line, made by an official Fiat Chrysler Automobiles S.p.A. supplier:

Metasystem S.p.A.

Via Galimberti, n°8
42100 Reggio Emilia (Italy)
Telephone
Switchboard: +39 0522 364 111
Fax
Switchboard: +39 0522 364 150
Web
Information at: info@metasystem.it
Web site: www.metasystem.it

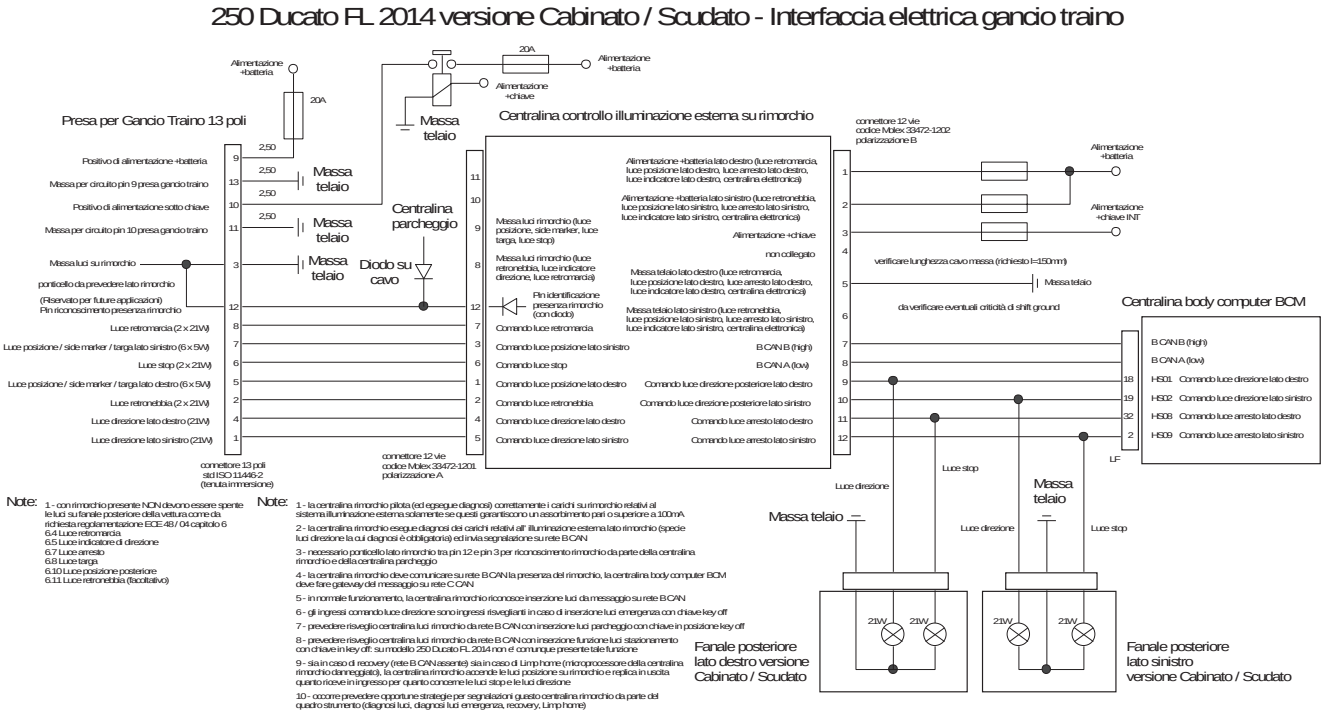
Trailer

Insertion of non-conforming control units into the main circuit of the New Ducato to control additional lights may cause a malfunction in the vehicle electrical/electronic system, for this reason Fiat Chrysler Automobiles S.p.A. recommends using original Accessory Line components. Any customisation can be agreed with the official suppliers of the component (see list below).

Westfalia-Automotive GmbH & Co. KG

Am Sandberg 45
Postfatch 26 40
33354 Rheda Wiedenbrück
Telephone
Switchboard: +49 5242 907 0
Fax
Switchboard: +49 5242 907 195
Web
Web site: www.westfalia-automotive.de

Opt. Towing Hook scheme

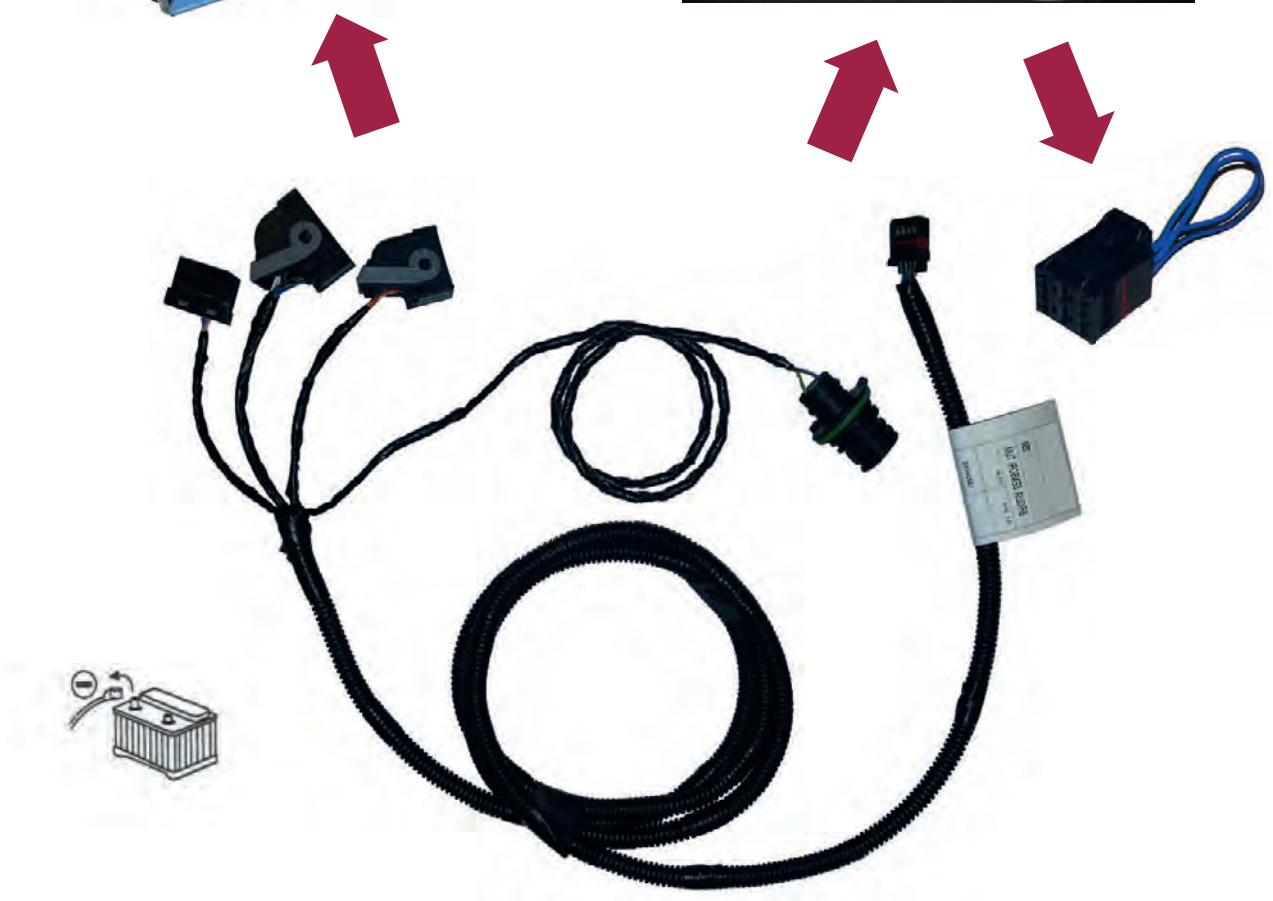


Robotised gearbox

When the robotised gearbox (opt 407) is installed on chassis cowl vehicles, or in any case without original cab doors, the external temperature sensor (see par. 5.3.4) and driver's door status switch (see par. 5.1.4) must also be installed.

COMPONENT : TUM - TRUCK UPFITTER MODULE

Part number : 1374095080
Type of vehicle : FIAT Ducato
Version : 250FL
Timing : 20’



TUM - TRUCK UPFITTER MODULE

TUM - TRUCK UPFITTER MODULE
This document describes the component called Truck Upfitter Module (TUM) and explains its installation.
The TUM is an electronic control unit that operates as a gateway from the vehicle's high and low-speed CANs to an external high-speed network that uses protocol J1939 and sends messages according to the Fleet Management System (FMS) version 2.0 standard. The messages available on the FMS network are described in Annex 1. For a complete description of the standard, visit the consortium[1] website.

[1] http://www.fms-standard.com

KIT COMPOSITION

ID	Component name	Quantity
A	ECU	TUM 1
B	ECU	TUM 1

Figure 1 - TUM Electronic Control Unit

Figure 2 - Connection harness

INSTALLATION STEPS

Disconnect the negative battery terminal.
Locate the box containing the fuses in the dashboard area, in the compartment under the steering wheel (this information is found in the owner handbook).
Remove the passenger compartment fuse box cover.
Having removed the cover, you will find the fuses right in front of you and you can locate **termination C.**

Figure 3 - Passenger compartment fuse box

After locating termination C, remove connector D.

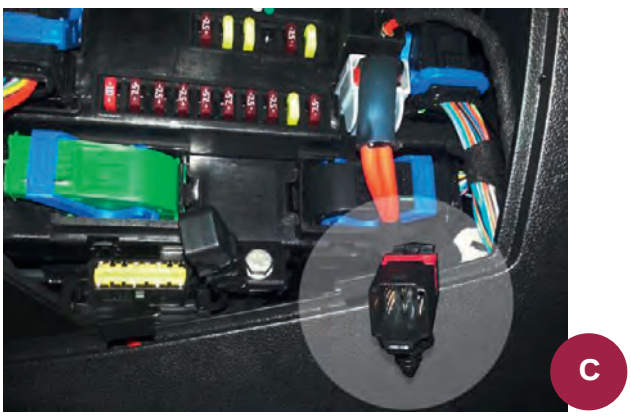


Figure 4 - Connector ready for connecting harness B

Figure 5 - Termination connector

Secure **termination B5** of the connection harness to termination C.

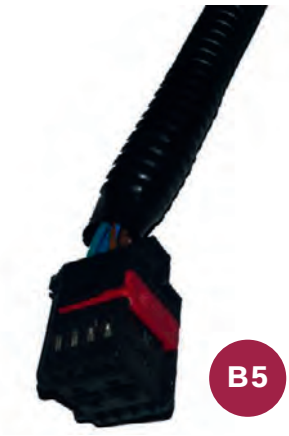


Figure 6 - Termination of the connection harness

Secure terminations **B1, B2, B3** to connectors **A1, A2, A3** of the TUM, respectively

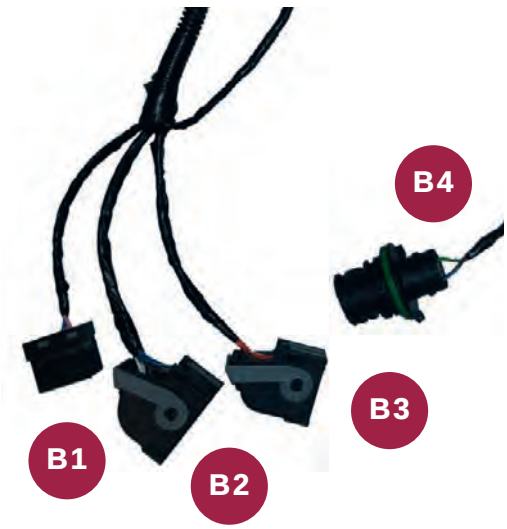


Figure 7 - Terminations of the connection harness

Figure 8 - TUM control unit connectors

After connection, the previously removed parts of the car can be reassembled.
Final positioning and fastening of the control unit is at the converter's discretion.

INSTALLATION REQUIREMENTS AND RECOMMENDATIONS

The control unit is not waterproof and must therefore be installed in a dry area, preferably in the passenger compartment.
Make provision for two fastening points 136 mm apart.
The space occupied by the control unit (size) is: 150 mm x 110 mm x 40 mm.

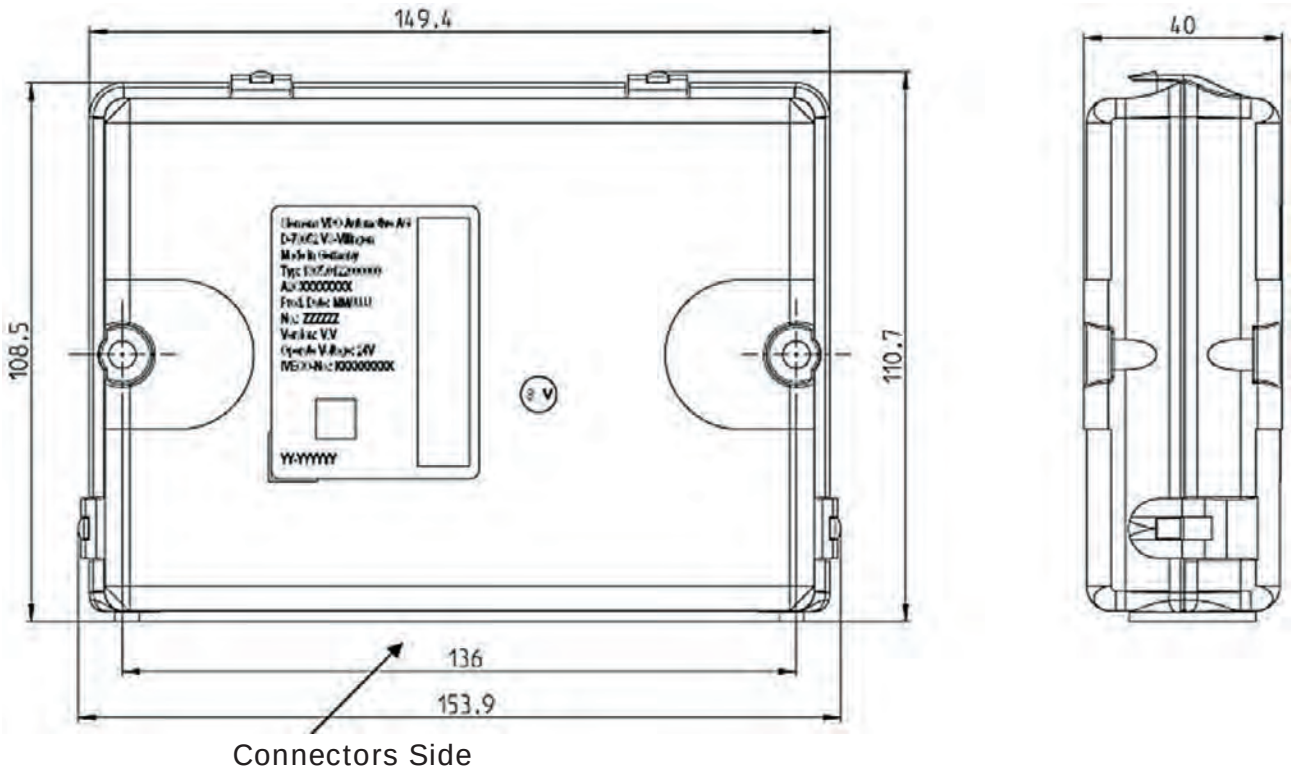
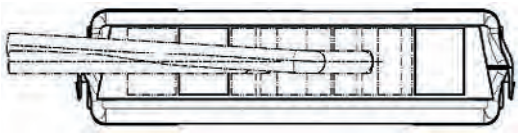


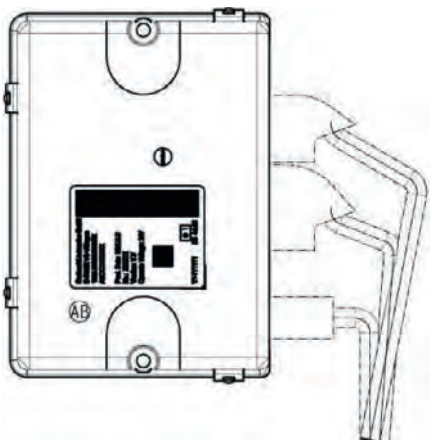
Figure 9 - TUM control unit dimensions

It is advisable to secure the control unit onto a flat surface, using one of the following positions.

1. Horizontal (Connections seen from the front)
   Direction of the output wiring: toward the left side.



2. Vertical
   (Connections seen on the right side)
   Direction of the output wiring:
   downwards.



3. Vertical
   (Connections seen at the bottom)
   Direction of the output wiring:
   toward the left side.

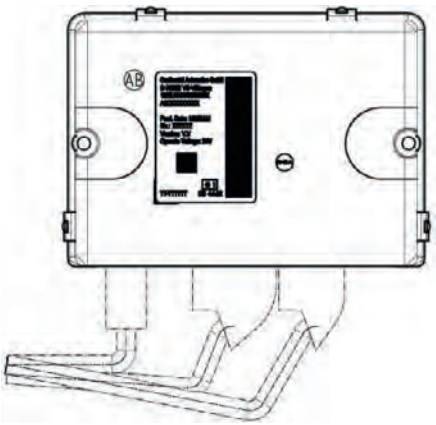


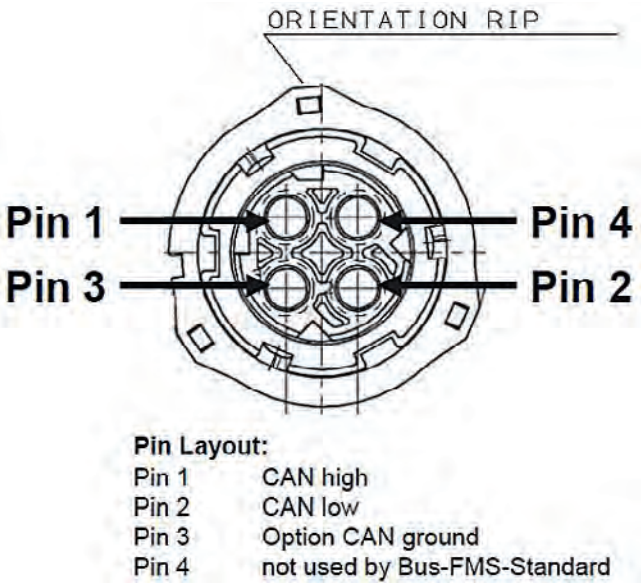
Figure 10 - Recommended positions for securing the TUM control unit

Connector B4 is a standard connector used by the control unit users to collect the vehicle's information, so it is advisable to ensure it is located at an easily accessible point to facilitate its use.

Figure 11 - Standard connector for users

The connector Pin Out for the users is defined and set by the FMS standard. An extract of the standard with a description of its outputs is provided below. For a complete description of the standard, visit the consortium[1] website.

[1]http://www.fms-standard.com



Pin Layout:

Pin 1	CAN high
Pin 2	CAN low
Pin 3	Option CAN ground
Pin 4	not used by Bus-FMS-Standard

DIN 72585 connector
4-Pin male type (vehicle side)

AMP	**Chassis part (vehicle)**	**Coding 1 (black)**
	Housing w/o pin/socket locking	1-967402-1
	Pin (Sn plated) 0-929974-1	0-929974-1
	Seal 828920-1	828920-1
	Cap (for not used connector)	1394277-2
AMP	**FMS side (cable)**	
	Housing	1-967325-1
	Socket (Sn plated)	0-929967-1
	Seal	828920-1
GH	**Chassis part (vehicle)**	
	Housing	18337.000.000
	Pin/socket locking	16052.598.613
	Pin (Sn plated)	26634.201.184
	Seal	14414.627.626
	Cap (for not used connector)	N/A
GH	**FMS side (cable)**	
	Housing	17984.000.002
	Pin/socket locking	16052.598.613
	Socket (Sn plated)	26570.201.184
	Seal	14414.627.626

Figure 12 – Connector Pin Out for the users (*)
***Extract of the FMS standard**

NOTE FOR USERS

The terminal resistance is currently not activated on the TUM control unit. If necessary, an internal terminal resistance of 120 Ω may be activated by short circuiting pins 10 and 17 of connector B3 of the connection harness (see Figure 7).

TRUCK UPFITTER MODULE (TUM) FUNCTIONS

The TUM supports the following FMS standard versions:
- FMS-Standard Interface description Vers. 02 (available on http://www.fms-standard.com/Truck/index.htm)
- Bus FMS-Standard Interface description Vers. 02 (available on http://www.fms-standard.com/Bus/index.htm)

All the signals available to the control units that interface with the TUM are listed in the following table.

Message	Signal	Description
CCVS	Parking Brake Switch	Indicates that the parking brake is engaged
	Wheel based speed	Indicates the vehicle speed
	Clutch switch	Indicates that the clutch pedal is pressed
	Brake switch	Indicates that the brake pedal is pressed
	Cruise control active	Indicates that the cruise control is enabled
EEC2	Accelerator pedal position 1	Indicates the accelerator pedal position
	Engine Percent Load At Current Speed	Indicates the ratio between the percentage of engine torque and the maximum torque indicated at current engine speed
LFC	Engine total fuel used	Indicates the total fuel consumed during vehicle operation
DD	Fuel Level	Indicates the ratio of fuel volume out of the total tank volume
EEC1	Engine speed	Indicates the engine speed
VDHR	High resolution total vehicle distance	Indicates the total distance travelled by the vehicle
ET1	Engine coolant temperature	Indicates the engine coolant temperature
AMB	Ambient Air Temperature	Indicates the temperature outside the vehicle
LFE	Fuel Rate	Indicates the quantity of fuel consumed by the engine by time unit
	Instantaneous Fuel Economy	Indicates the ratio between quantity of fuel consumed and current vehicle speed
SERV	Service distance	Indicates the distance that can be travelled by the vehicle before the scheduled servicing
HOURS	Total engine hours	Indicates the total engine operation time
DC1	Position of doors	Indicates the current door status
AS	Alternator Status 1	Indicates the current alternator status
ETC2	Selected Gear (1)	Indicates the next expected gear ratio
	Current Gear (1)	Indicates the current gear ratio
TD	Minutes	Indicates the minutes
	Hours	Indicates the hours
	Month	Indicates the month
	Day	Indicates the day
	Year	Indicates the year

FMS1[2]	High beam, main beam	Indicates the active status of the main beam headlights
	Low beam	Indicates the active status of the low beam headlights
	Turn signals	Indicates the active status of the direction indicators
	Hazard warning	Indicates the active status of the hazard warning lights
	Parking Brake	Indicates that the parking brake is engaged
	Brake failure/brake system malfunction	Indicates a failure of the braking system
	Hatch open	Indicates that the rear door is not closed
	Fuel level	Indicates that the fuel reserve warning light is on
	Engine coolant temperature	Indicates that the maximum engine coolant temperature warning light is on
	Battery charging condition	Indicates that the low battery charge warning light is on
	Engine oil	Indicates that the low engine oil pressure warning light is on
	Position lights,side lights	Indicates the active status of the position lights
	Front fog light	Indicates the active status of the fog lights
	Rear fog light	Indicates the active status of the rear fog lights
	Engine / Mil indicator	Indicates that the EOBD/injection system warning light is on
	Service, call for maintenance	Indicates that the scheduled servicing indicator is displayed
	Transmission failure/malfunction	Indicates a failure on the transmission system
	Anti-lock brake system failure	Indicates that the ABS system failure warning light is on
	Worn brake linings	Indicates that the brake pad wear warning light is on
	Malfunction/general failure	Indicates that the general failure warning light is on
	Height Control (Levelling)	Indicates that the active suspension indicator is displayed
	Engine Emission system failure (Mil indicator)	Indicates that the particle filter blocked warning light is on
	ESC indication	Indicates that the stability control system warning light is on
TCO1	Tachogr. vehicle speed [3]	Indicates the vehicle speed stored by the tachograph
DC2	Open Status Door 1	Indicates the status of the driver's door
	Open Status Door 2	Indicates the status of the passenger's door
	Open Status Door 3 [4]	Indicates the status of the rear door(s)
	Open Status Door 4 [4]	Indicates the status of the sliding side doors
	Open Status Door 5 [4]	Indicates the status of the sliding side doors
FMS	Requests supported	Indicates whether the TUM is able to respond to the requests made by the external FMS module
	Diagnostics supported	Indicates whether the TUM supports the requests to send diagnostic information
	FMS-standard SW-version supported	Indicates the version of the FMS Standard supported by the TUM

[1] Available in the vehicle versions with robotised gearbox
[2] The signal values come from the information displayed on the instrument panel
[3] The car speed signal is available even if there is no tachograph
[4] The transmitted signal takes the closed value if there is no content

DUCATO 250 –Truck Upfitter Module installation

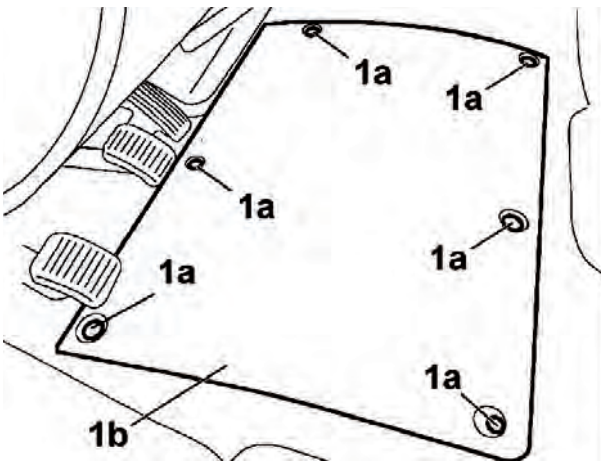
Installation details

Adobe Acrobat Document

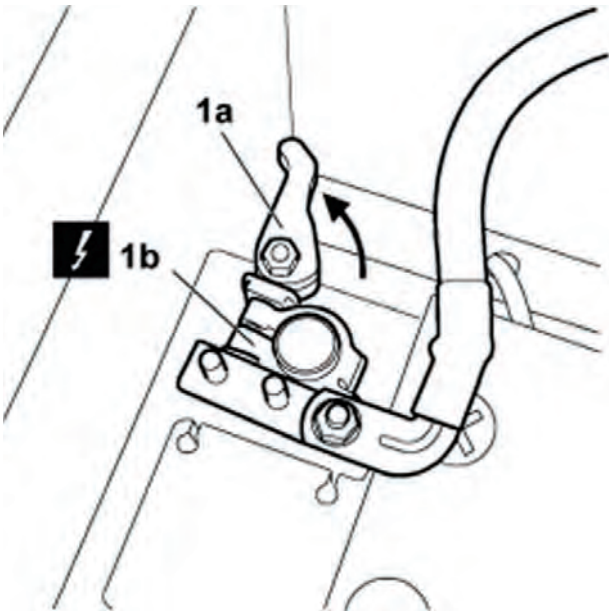
Installation cycle

- Turn the key on STOP and remove it.
- Slide completely backward the driver seat.

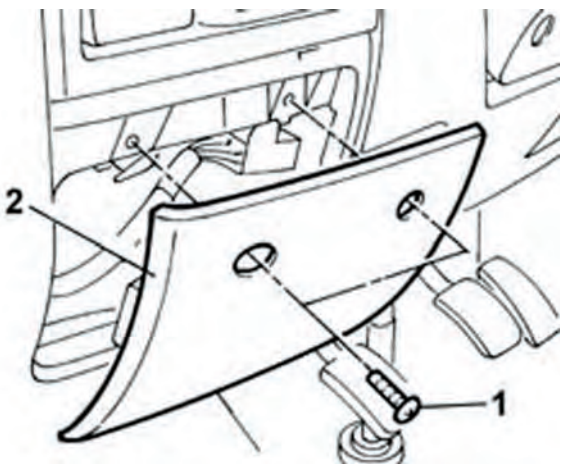
1. Remove fixing buttons (1a) and remove cover (1b).



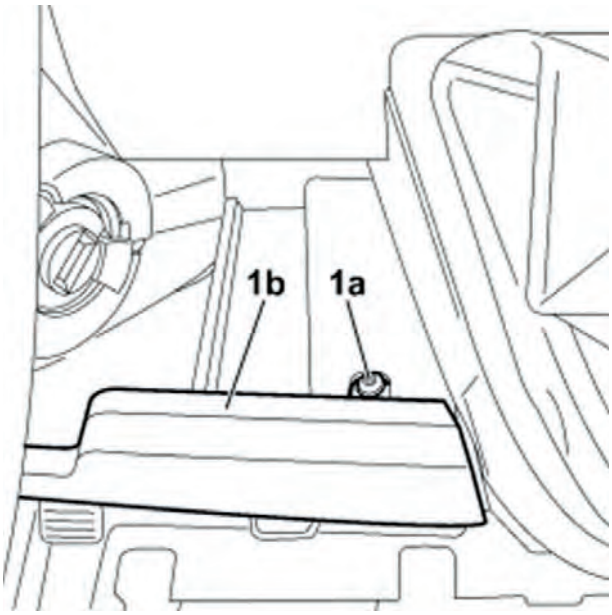
1. Rotate the lever (1a) as illustrated and disconnect the negative terminal (1b) from the battery.



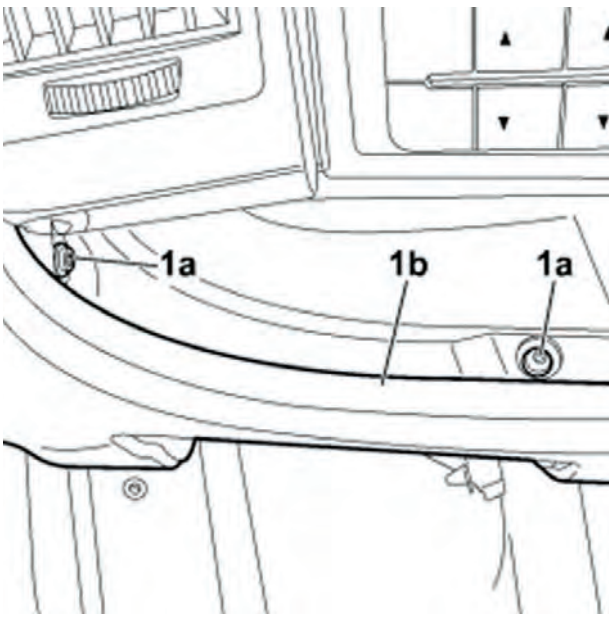
2. Undo the fixing screws.(1).
3. Remove the fuse access cover (2).



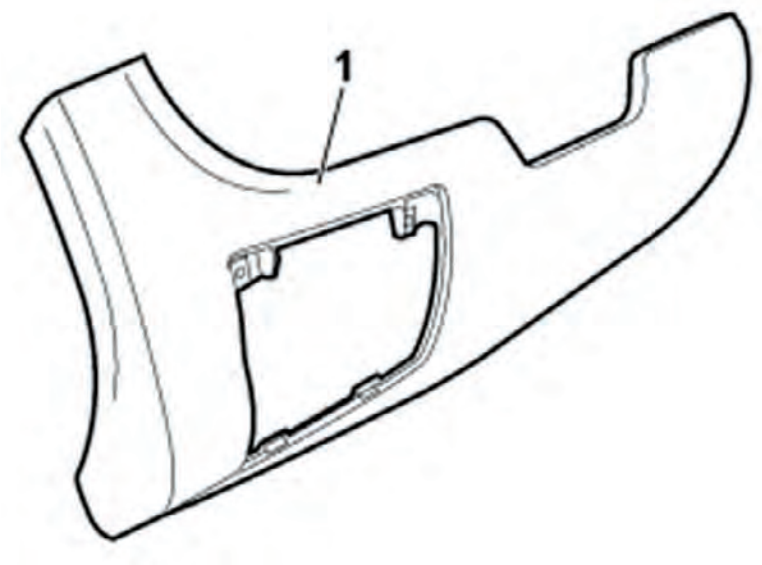
4. Undo the screw (1a) fixing the lower left trim of the dashboard (1b) located to the right of the steering wheel.



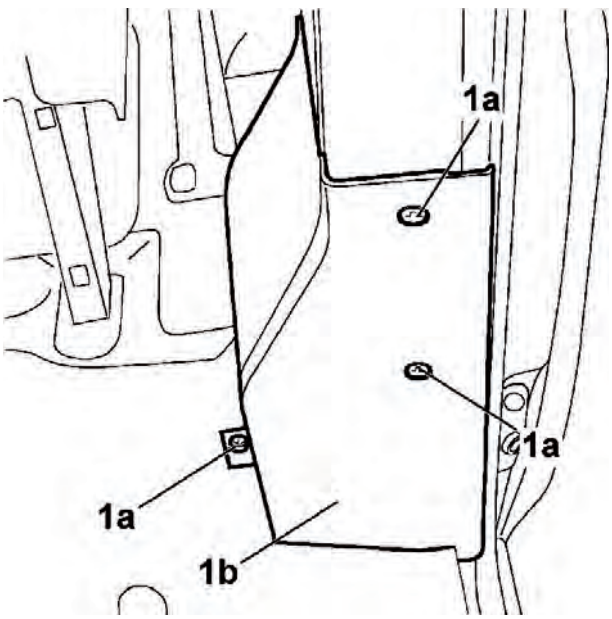
5. Undo the screws (1a) fixing the lower left trim of the dashboard (1b) located to the left of the steering wheel.



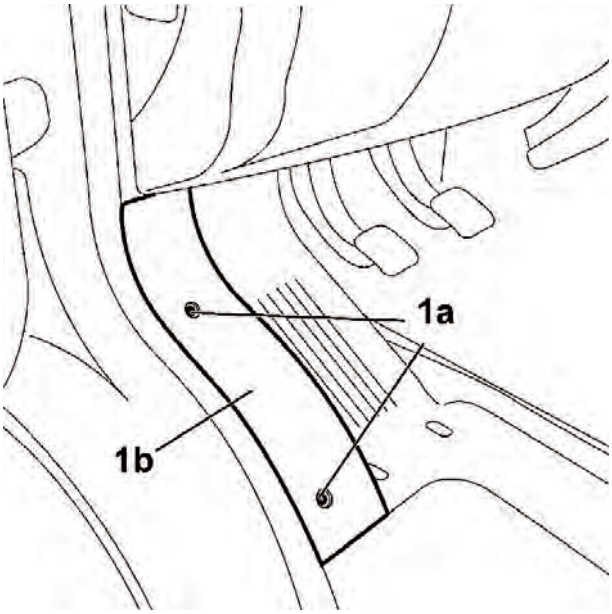
6. Remove the lower left trim of the dashboard from the vehicle.



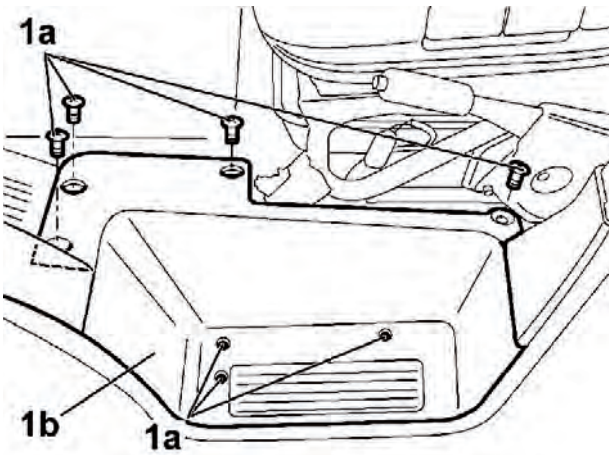
7. Undo the fixing screws (1a) for the centre pillar trim lower element (1b).



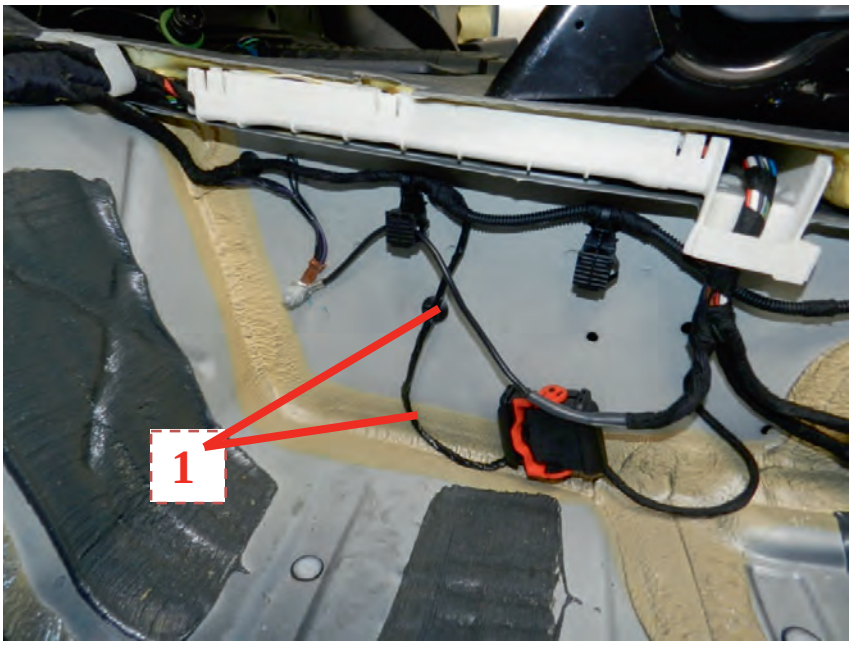
8. Undo the fixing screws (1a) and remove the kick plate connector (1b).



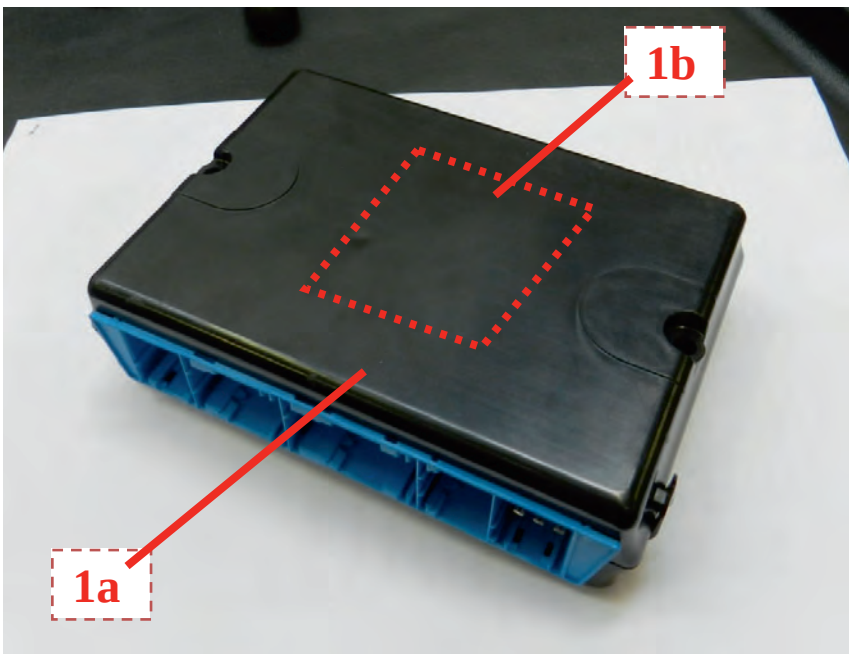
9. Undo the fixing screws (1a) and remove the kick plate (1b).



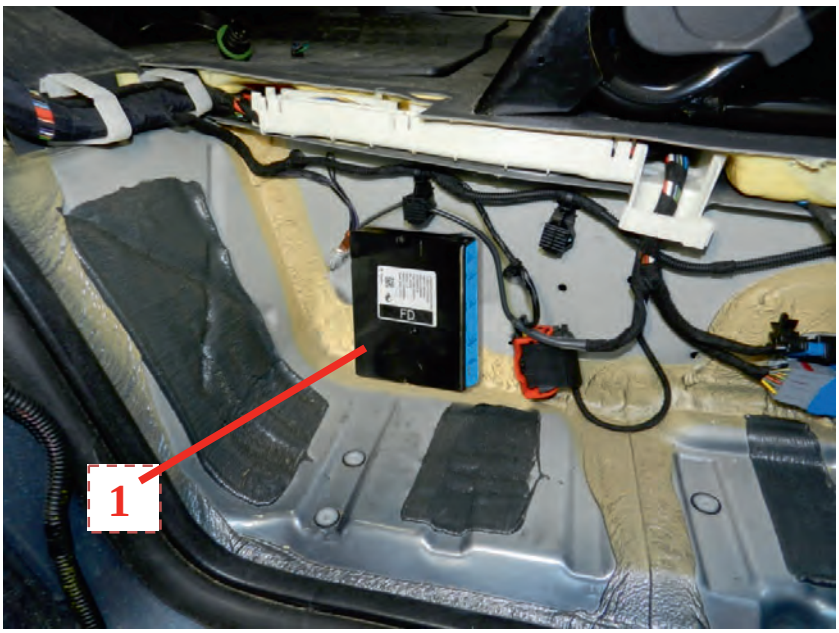
10. Remove the wiring retaining button and move it to the side (1).



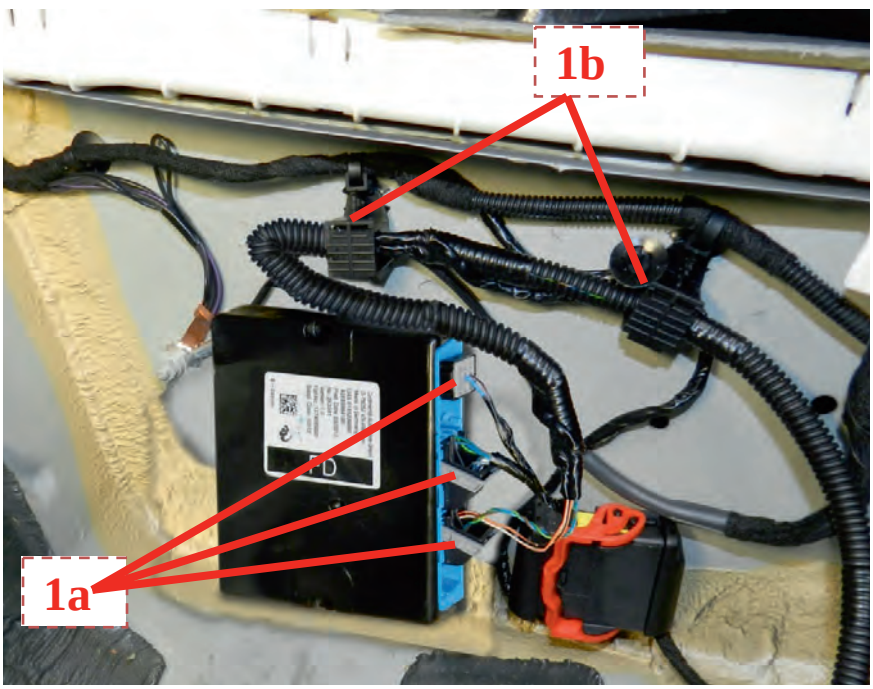
11. Thoroughly grease the rear surface of the control unit (1a) with heptane (or isopropyl alcohol) and apply a Velcro cutting (1b) of a size that ensures that the control unit remains secured.



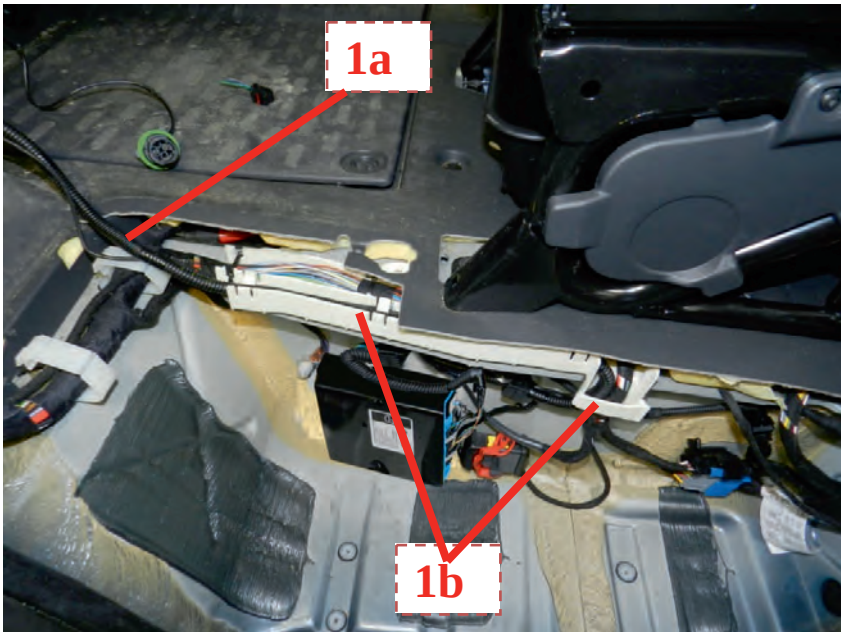
12. Thoroughly grease the surface of the body where the control unit will be positioned with heptane (or isopropyl alcohol). Remove the protective film of the adhesive surface from the Velcro, then position the control unit on the vehicle as shown in the figure, making sure it is firmly secured.



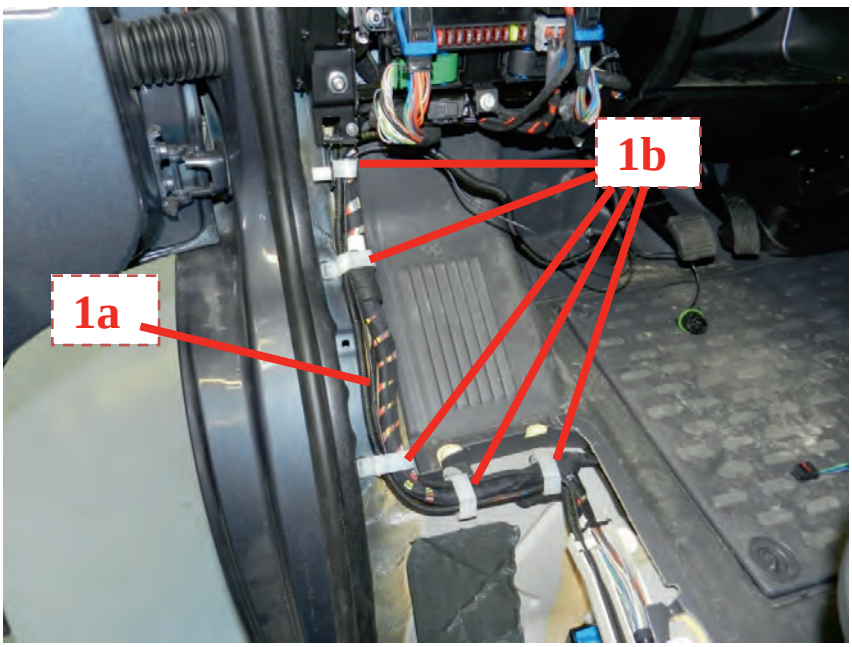
13. Take the wiring supplied in the kit and connect the electrical connections (1a) to the control unit, then use the bands (1b) on the vehicle to secure the control unit wiring and that of the vehicle previously unfastened.



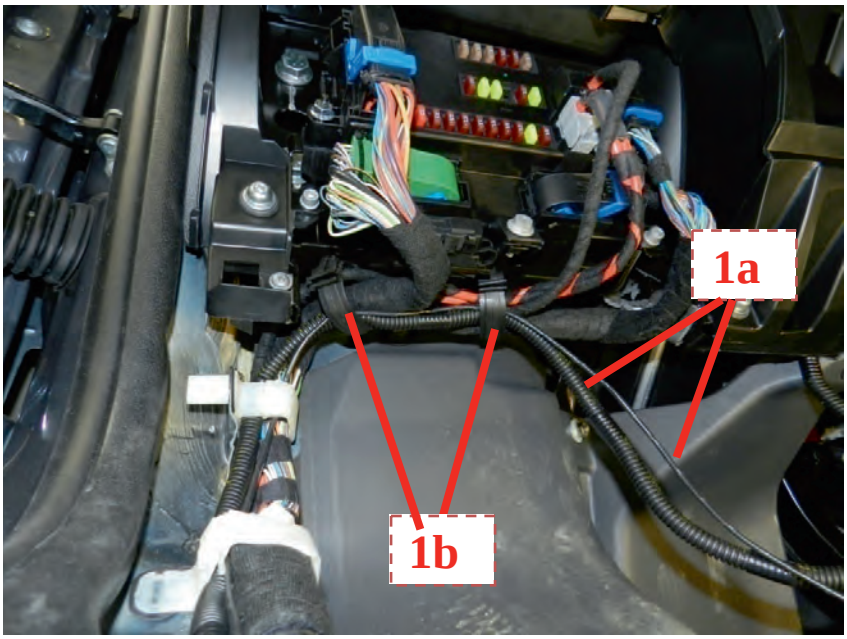
14. Place the wiring (1a) of the control unit inside the cable duct (1b) positioned on the vehicle, then secure using the clips provided.



15. Place the wiring (1a) of the control unit inside the retaining clips (1b) of the vehicle wiring.

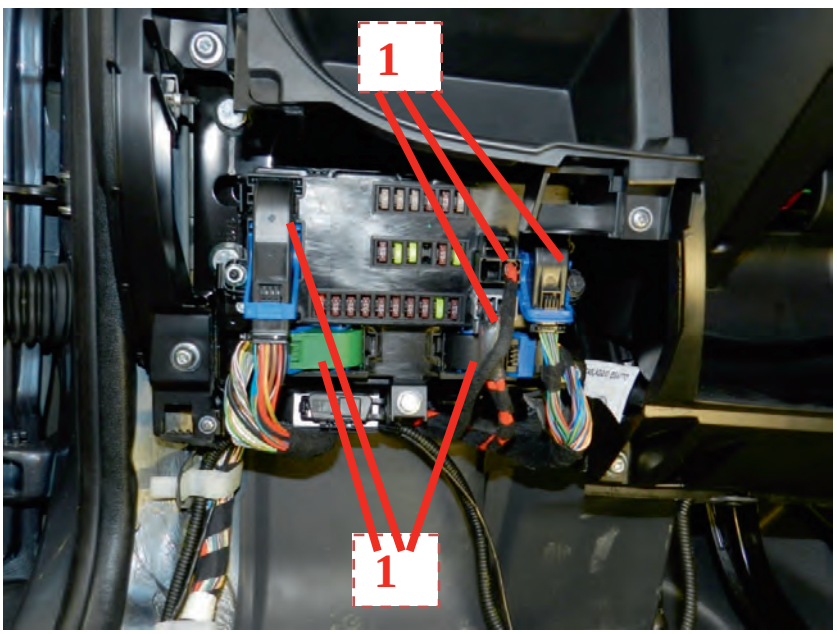


16. Place the wiring (1a) of the control unit inside the retaining clips (1b) of the vehicle wiring.

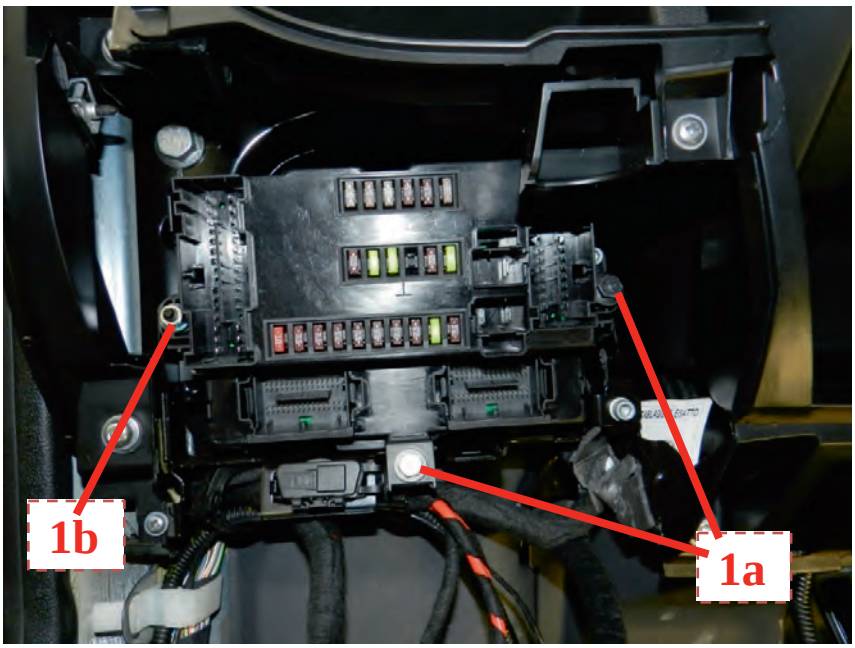


NOTE: If the wiring cannot be inserted in the duct and/or retaining clips as previously explained, it should be placed beside the original wiring of the vehicle and secured to it using plastic bands.

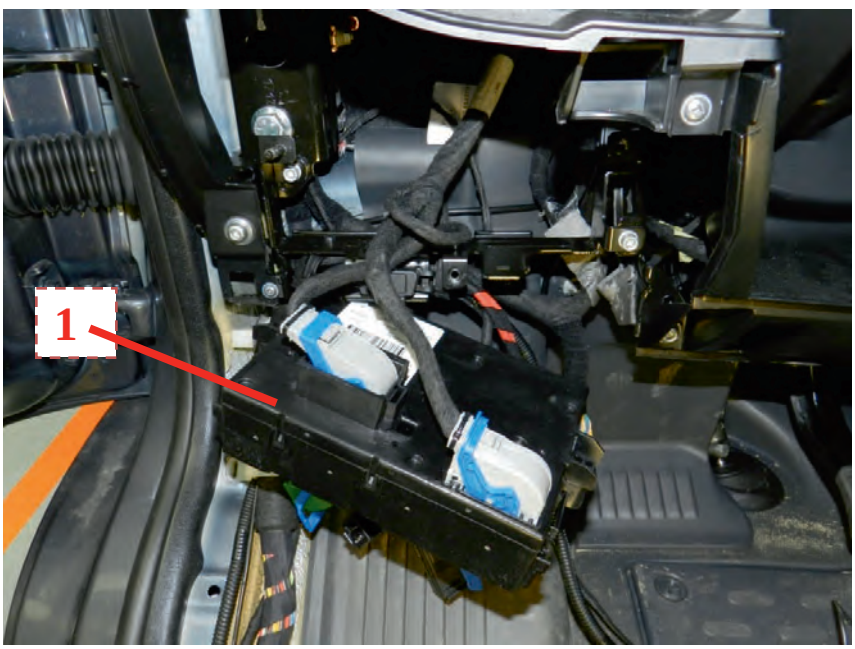
17. Disconnect the Body Computer.



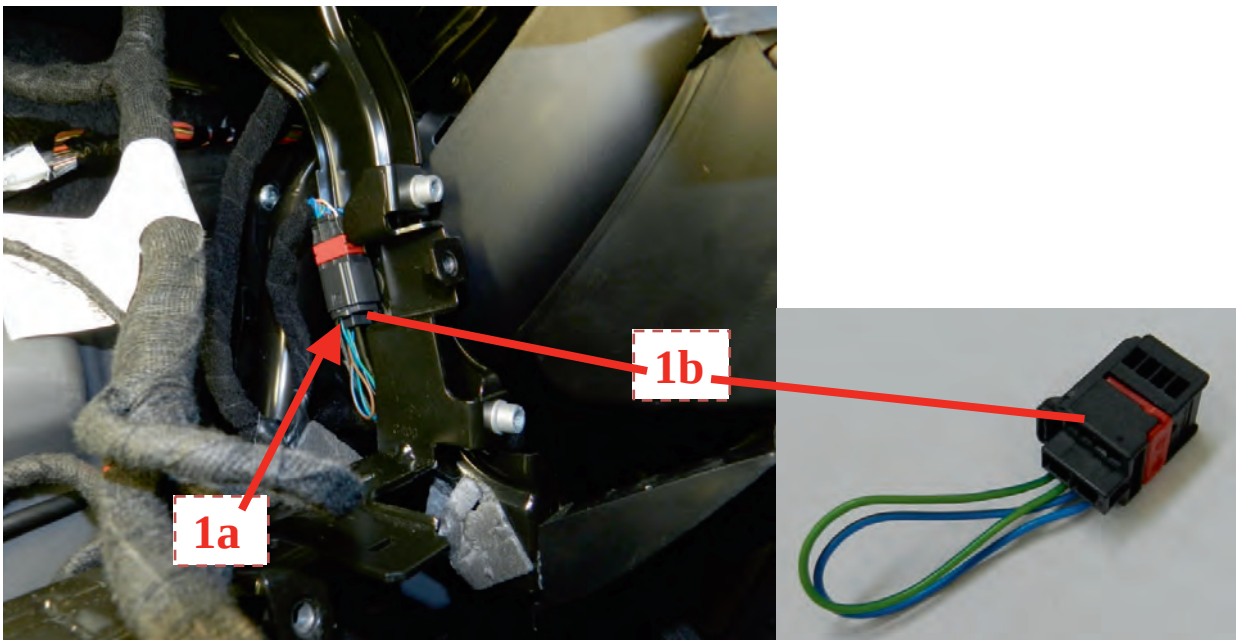
18. Undo the screws (1a) and the nut (1b) securing the Body Computer.



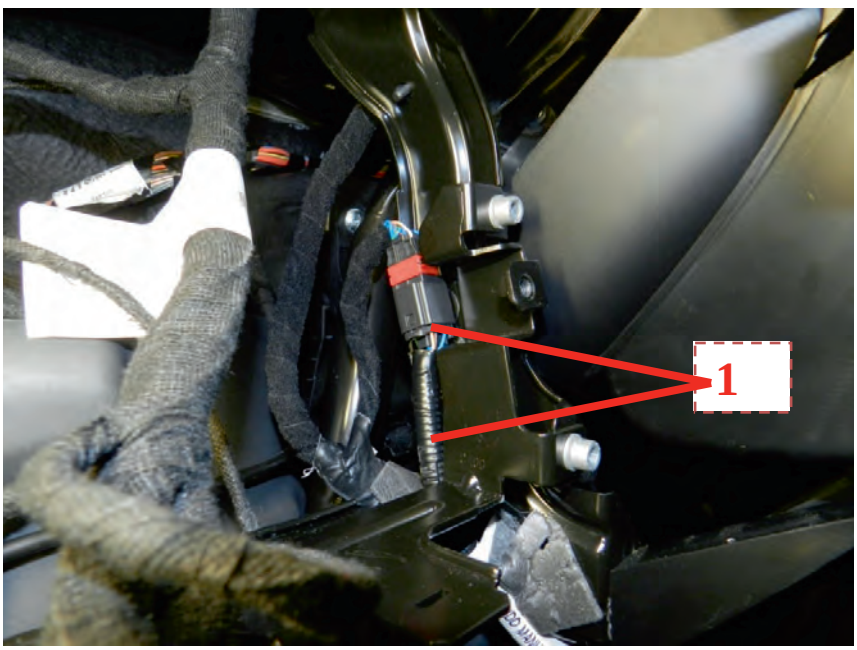
19. Remove the Body Computer being careful not to damage the wiring-harness.



20. Press the retaining clip (1a), then disconnect and remove the short circuit connector (1b).

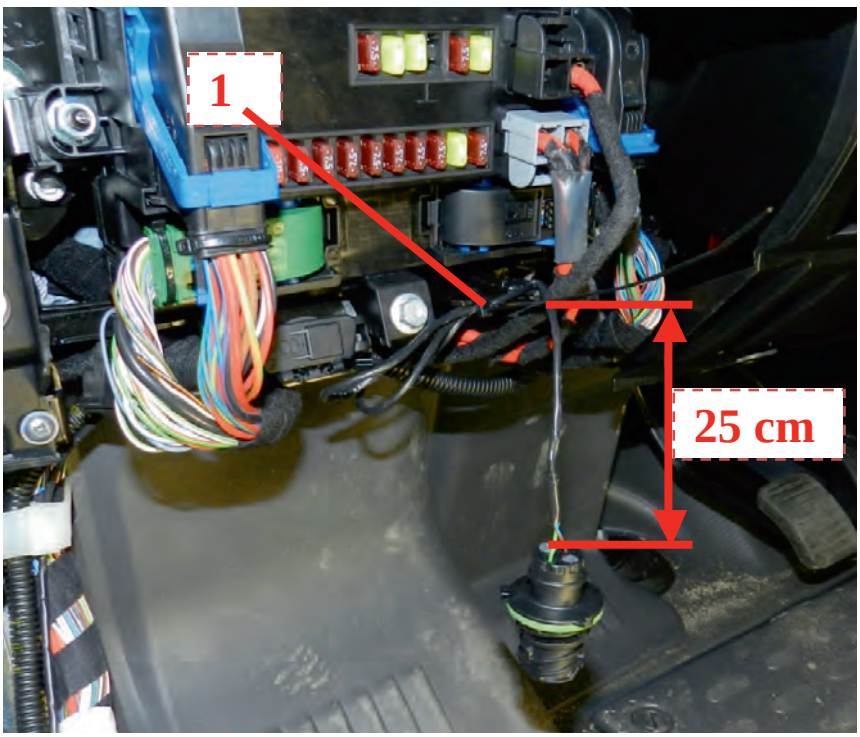


21. Connect the electrical connection of the control unit wiring, and position the wiring in the lower part of the Body Computer mounting bracket.

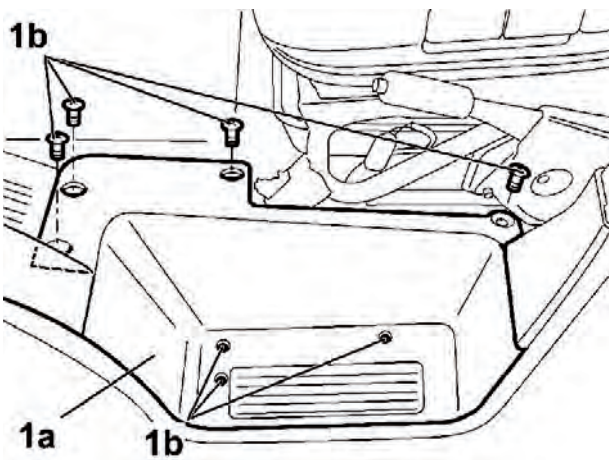


- Put back in place the Body Computer screw it.
- Connect all the electric connections.

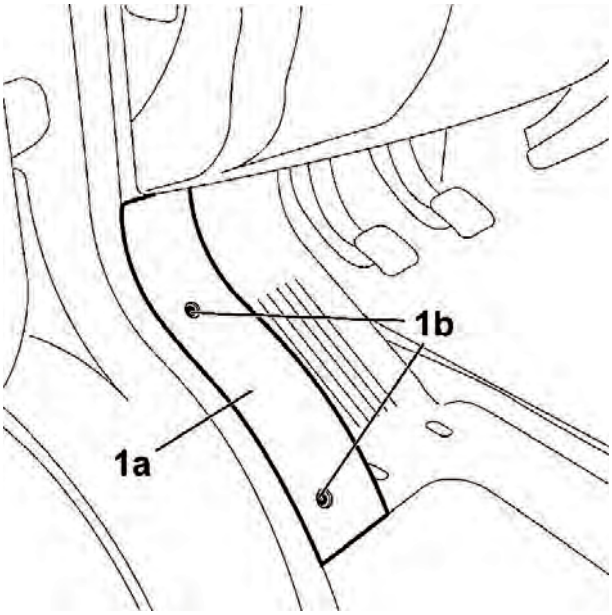
22. Roll up the exceeding length of wiring and fix it on the Body Computer bracket with a strip, keeping about 25 cm of free wiring, so that it can be easily removed if needed.



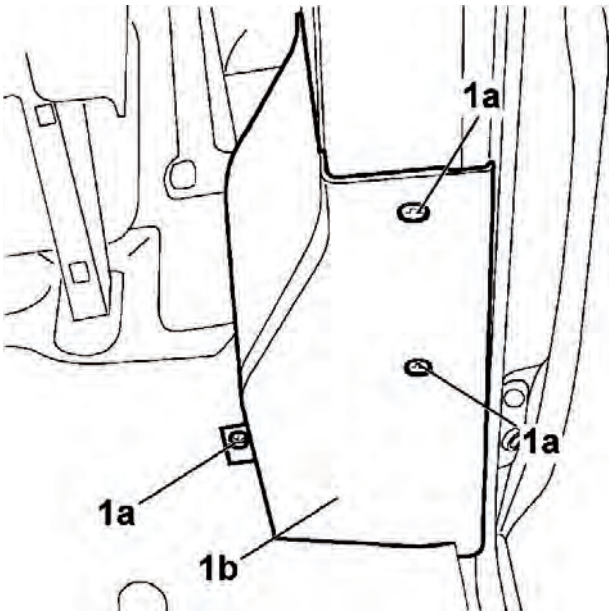
23. Put back in place the sill mould (1a) and fix it with screws (1b).



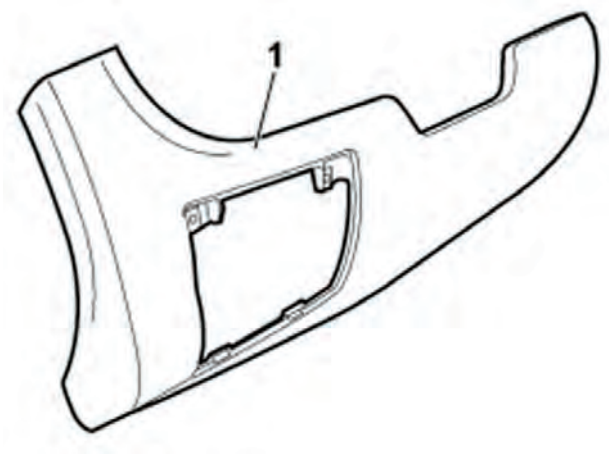
24. Put back in place the sill mould corner part (1a) and fix it with screws (1b).



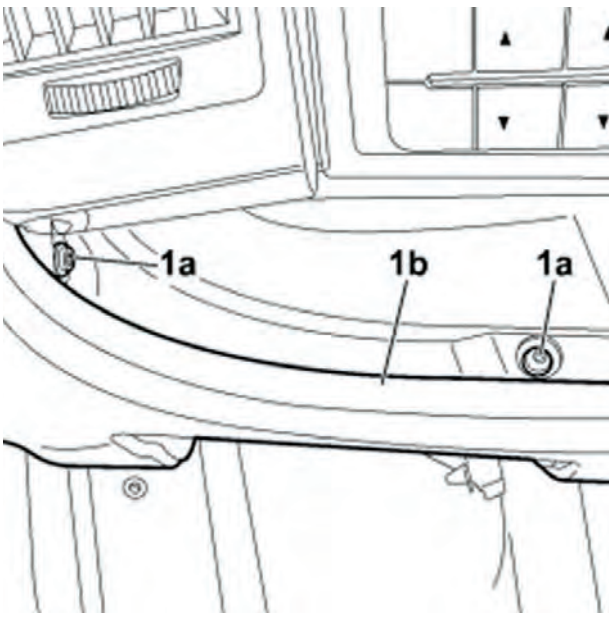
25. Put back in place the B-pillar lower cover (1a) and fix it with screws (1b).



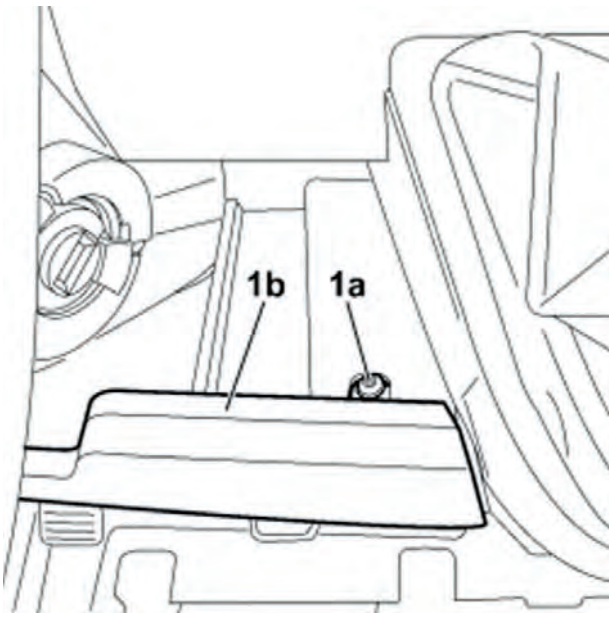
26. Put back in place the lower dashboard cover.



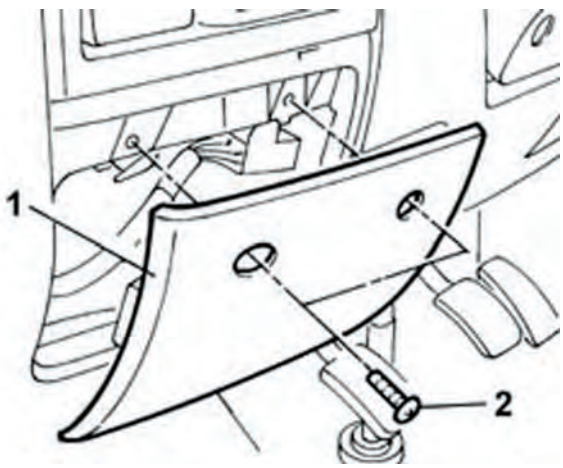
27. Put back in place the screws (1a) to fix the lower dashboard cover (1b) on the left side of the steering-wheel.



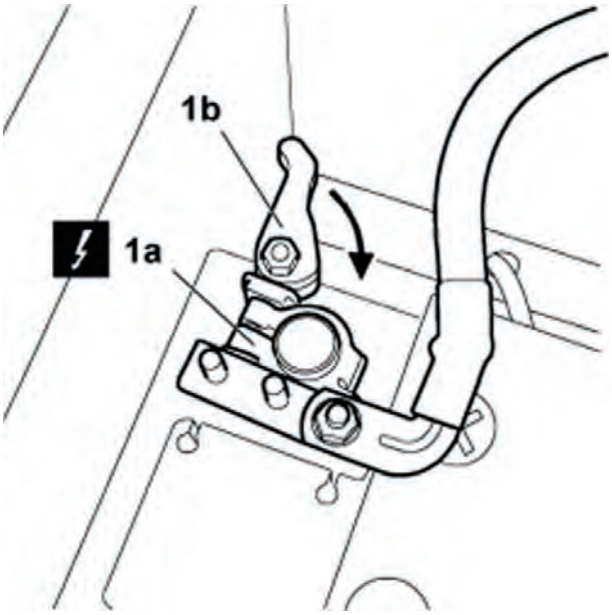
28. Put back in place the screws (1a) to fix the lower dashboard cover (1b) on the right side of the steering-wheel.



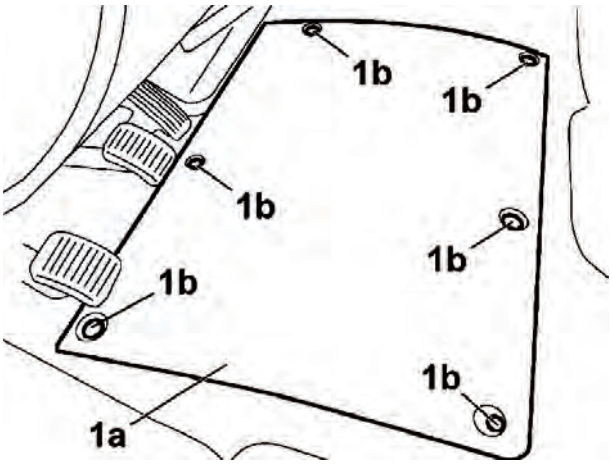
29. Put back in place the fuse-box cover (1) and fix it with the screws (2).



30. Connect the battery negative pole (1a) and turn the lever (1b) as shown in the picture.

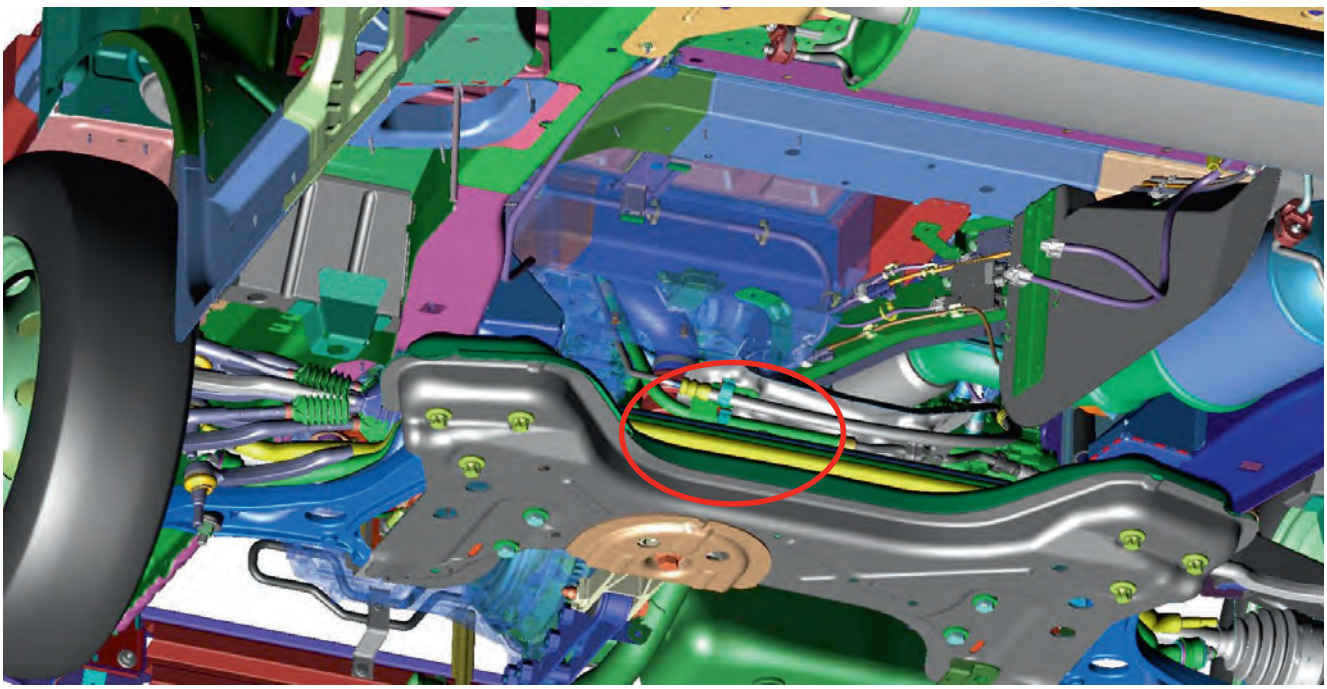


31. Put back in place the cover (1a) and fix with the plugs (1b).

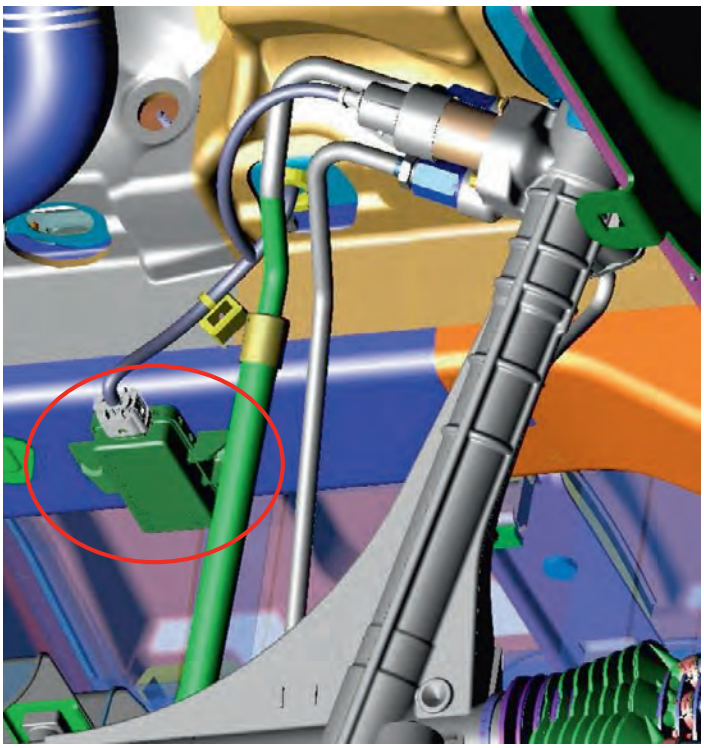


TPMS – installation prescriptions
When a TPMS system is present, additional prescriptions have to be considered.

TMPS system allows to monitor tires status by a radio transmission of the inflation pressure values, read by sensors integrated in the inflation valve.
Not to interfere with the data transmission, positioning any power cable near (150 mm) the receiver module is forbidden (see picture XXX). Also devices causing its overheating are not allowed, therefore exhaust pipes of vehicle cabin heating systems have to be positioned far enough.

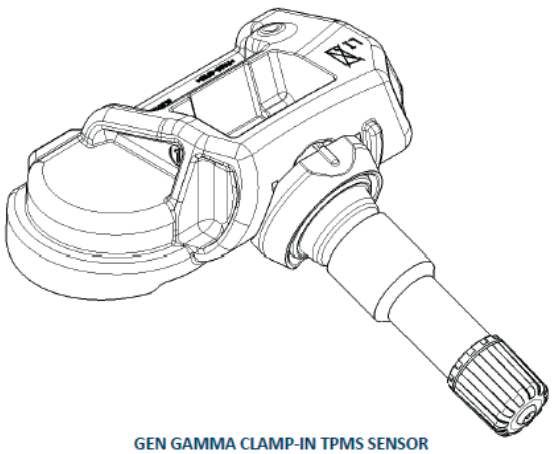


Position of TPMS module seen from the back



Position of TPMS module seen from under the engine

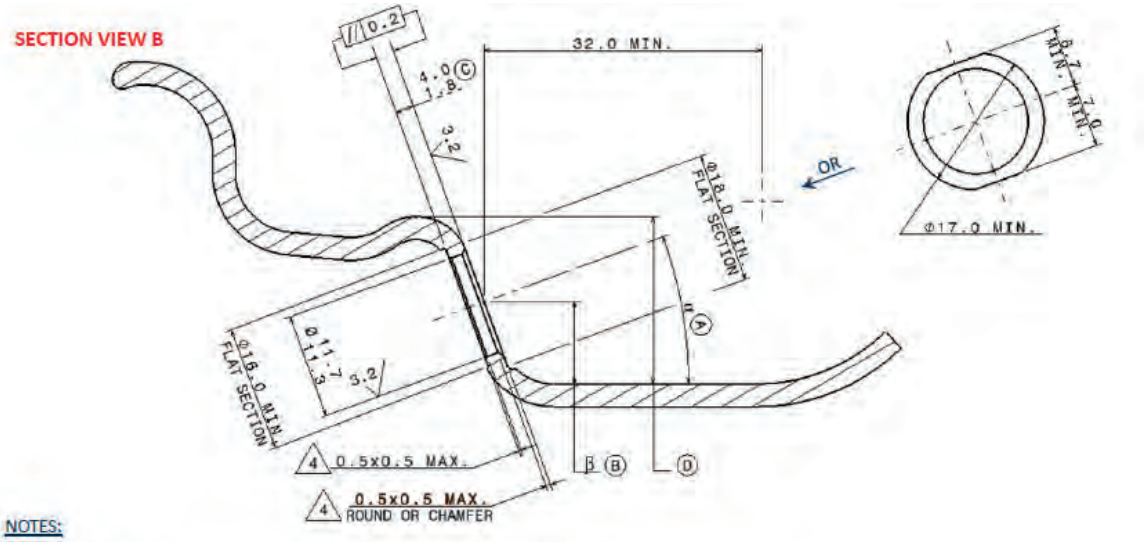
Installation requirements for pressure sensors integrated in tire inflation valve



GEN GAMMA CLAMP-IN TPMS SENSOR

Sensors integrated into the inflation valve, to correctly transmit the read data to the receiver module must be installed respecting the system supplier prescriptions.
Assembly specifications on the rims follow:

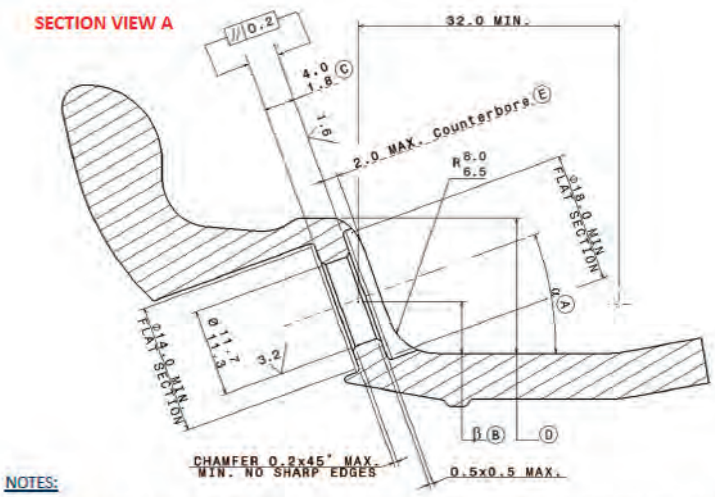
Steel rims

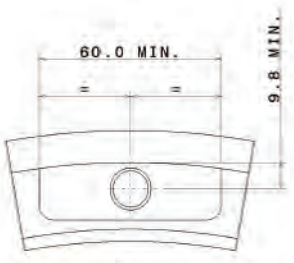


NOTES:

1. SECTION VIEW B SHOWS THE BASIC VALVE HOLE DIMENSIONAL REQUIREMENTS FOR STEEL RIMS
2. VALVE HOLE REQUIREMENTS FROM ETRTO 11.3J
3. *see* SHEET 5 FOR RELATIONSHIP BETWEEN DIMENSIONS α (A) AND β (B)
4. *see* SHEET 6 FOR DETAIL VIEW OF ROUNDED OR CHAMFERED "SOFT SHAPE" FORMED BY HOLE PUNCHING OPERATION
5. A WORSE CASE CAD FITMENT STUDY IS RECOMMENDED FOR ALL RIM SECTIONS
6. INFLATION TOOL CLEARANCE MUST BE CONSIDERED ON THE OUTSIDE FACE OF THE RIM

Light-alloy rims

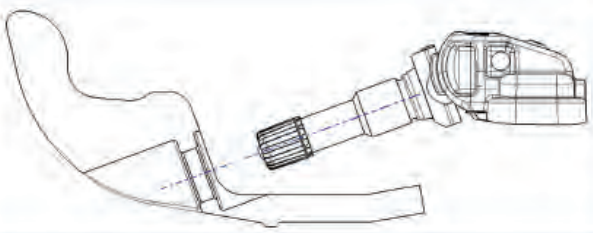
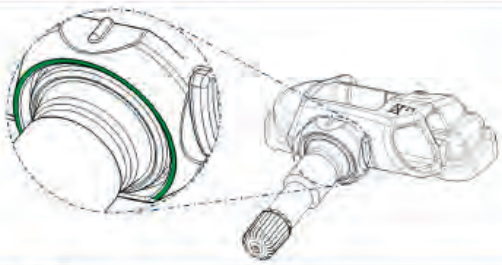
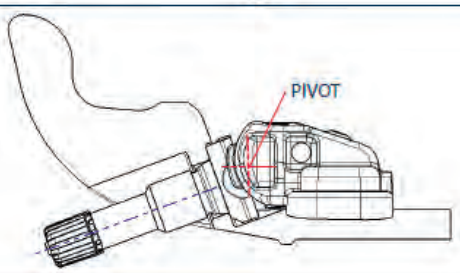




IF C'BORE CAUSES INTERFERENCE THEN THE ALTERNATIVE POCKET DESIGN SHOWN ABOVE CAN BE USED FOR FULL DEPTH OF POCKET

NOTES:

1. SECTION VIEW A SHOWS THE BASIC VALVE HOLE DIMENSIONAL REQUIREMENTS FOR ALLOY RIMS
2. VALVE HOLE REQUIREMENTS FROM ETRTO 11.3F
3. *see* SHEET 5 FOR RELATIONSHIP BETWEEN DIMENSIONS α (A) AND β (B)
4. *see* SHEET 6 FOR DETAIL VIEW OF ROUNDED OR CHAMFERED "SOFT SHAPE" FORMED BY HOLE PUNCHING OPERATION
5. A WORSE CASE CAD FITMENT STUDY IS RECOMMENDED FOR ALL RIM SECTIONS
6. INFLATION TOOL CLEARANCE MUST BE CONSIDERED ON THE OUTSIDE FACE OF THE RIM

	**ALIGN VALVE AXIS TO BE ON RIM VALVE HOLE AXIS** THE TMPS VALVE AND RIM HOLE ARE TO BE CONCENTRICALLY MATED WITH EACH OTHER
	**MATE FRONT COLLAR FACE TO RIM** THE COLLAR FACE (HIGHTLIGHTED) SHOULD TOUCH THE VALVE HOLE FLAT AREA NO OTHER PART OF THE SENSOR SHOULD INTERFERE WITH THE RIM
	**ANGLE ENCLOSURE TO RIM DROPWELL** THE TPMS BODY IS ROTATED UNTIL THE BOTTOM OF THE ENCLOSURE IS IN CONTACT WITH THE RIM

LDWS – installation prescriptions
LDWS system - overview

- **LDW (Lane Departing Warning):**
  - Is activated by a button on the central control panel, with an ON / OFF telltale light
  - Once active, the system works over 60 Km/h. Between 0 and 60 Km/h it's inhibited and shows it's not functioning keeping on two yellow light in the instrument cluster; once reached 60 Km/h the lights switch off and only work switching on left or right one to warn a deviation from road stripes.

- **HBC (automatic main light dipping) with light sensor:**
  - Is activated by the column stalk ring, setting it on AUTO; it switches on both HBC and light sensor.

- **HBC without light sensor:**
  - Is activated when parking, by the vehicle menu setting.

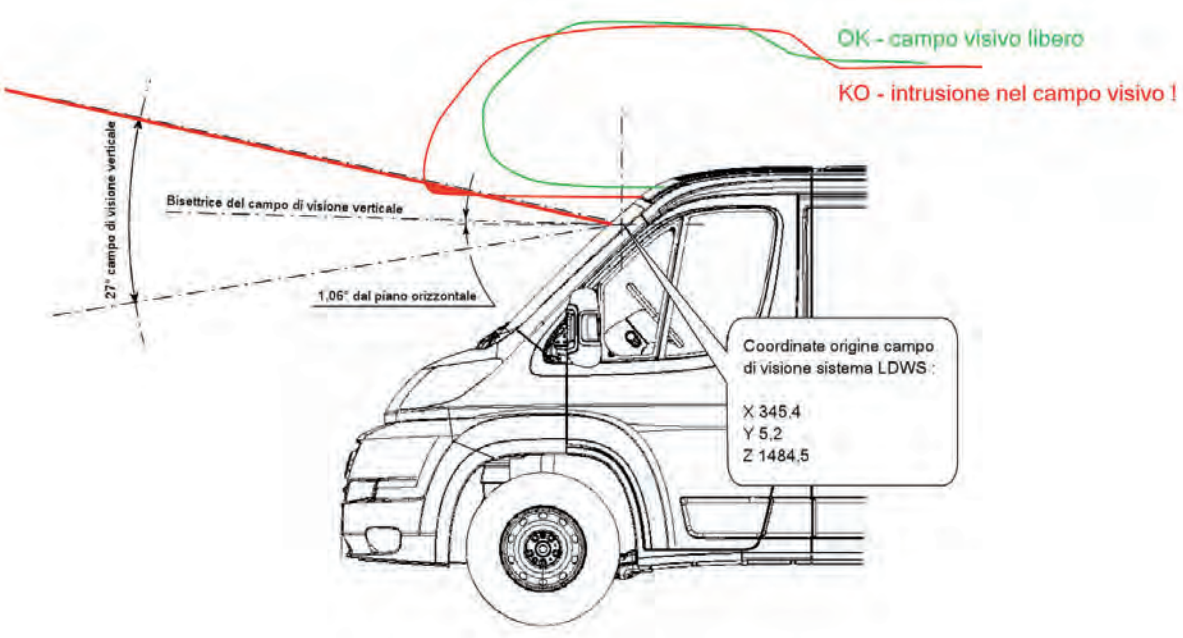
- **TSR (Traffic Signal Recognition)**
  - Is activated when parking, by the vehicle menu setting.

Prescriptions for vehicles with LDWS system – camera calibration

Due to the wide angle that the suspension geometry can have on the Ducato (different weight distribution according to upfitting needs), the standard calibration done in the production factory can be not enough, therefore the system has a self-calibration function that allows it to memorize the correct calibration while running. This function is activated when a change in the geometry moves the camera outside its working angle (e.g. when a chassis-cab is converted in a camping-car).
Re-calibration phase last about 2 min, if the system finds the required conditions (almost straight road, with only wide bends, and good weather and visibility), going on for up to one hour if the process fails. During calibration phase the system is inhibited and the driver is warned by the two yellow lights in the instrument cluster.

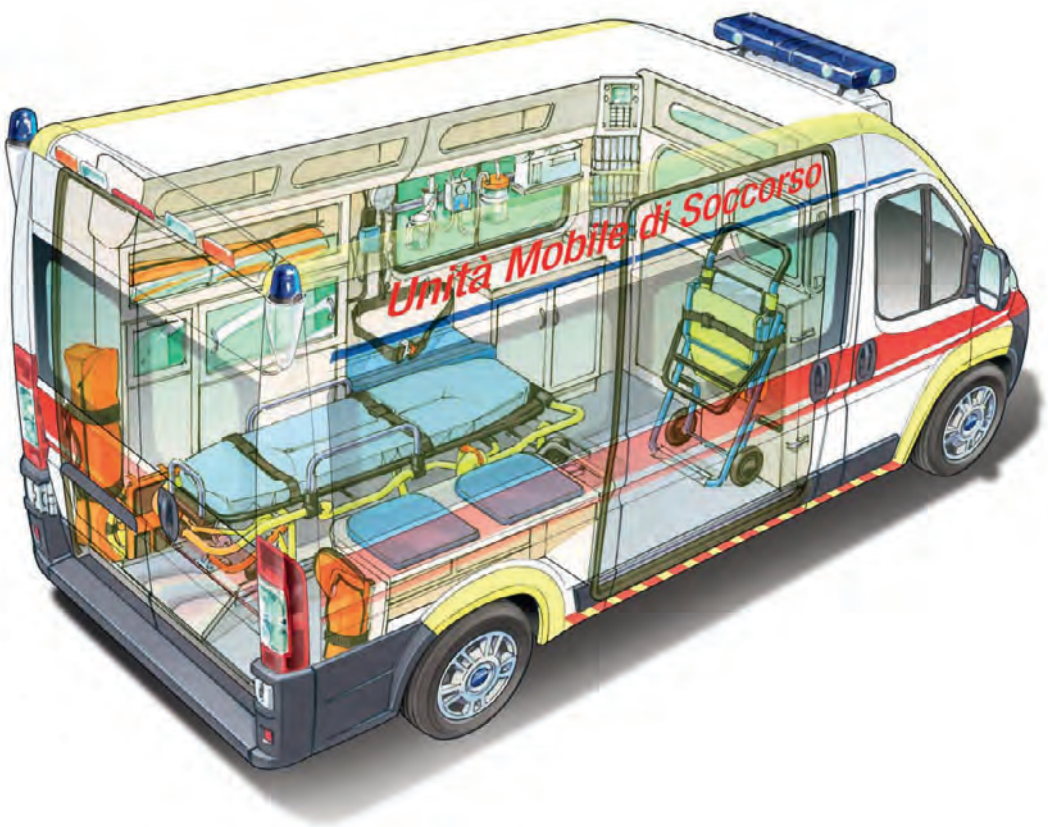
Not to void the system functionality, obstructions must not be present in the camera view angle.

In the following picture, the vertical view angle of the camera is highlighted. It's 27° wide, with the centerline positioned at 1,06° over the horizon.
For a proper functioning of the system, additional body parts must never interfere with the camera view-angle. This prescription is both for fixed (e.g. a camper cabover) or temporary (e.g. a roof-rack) items.



LDWS view-angle

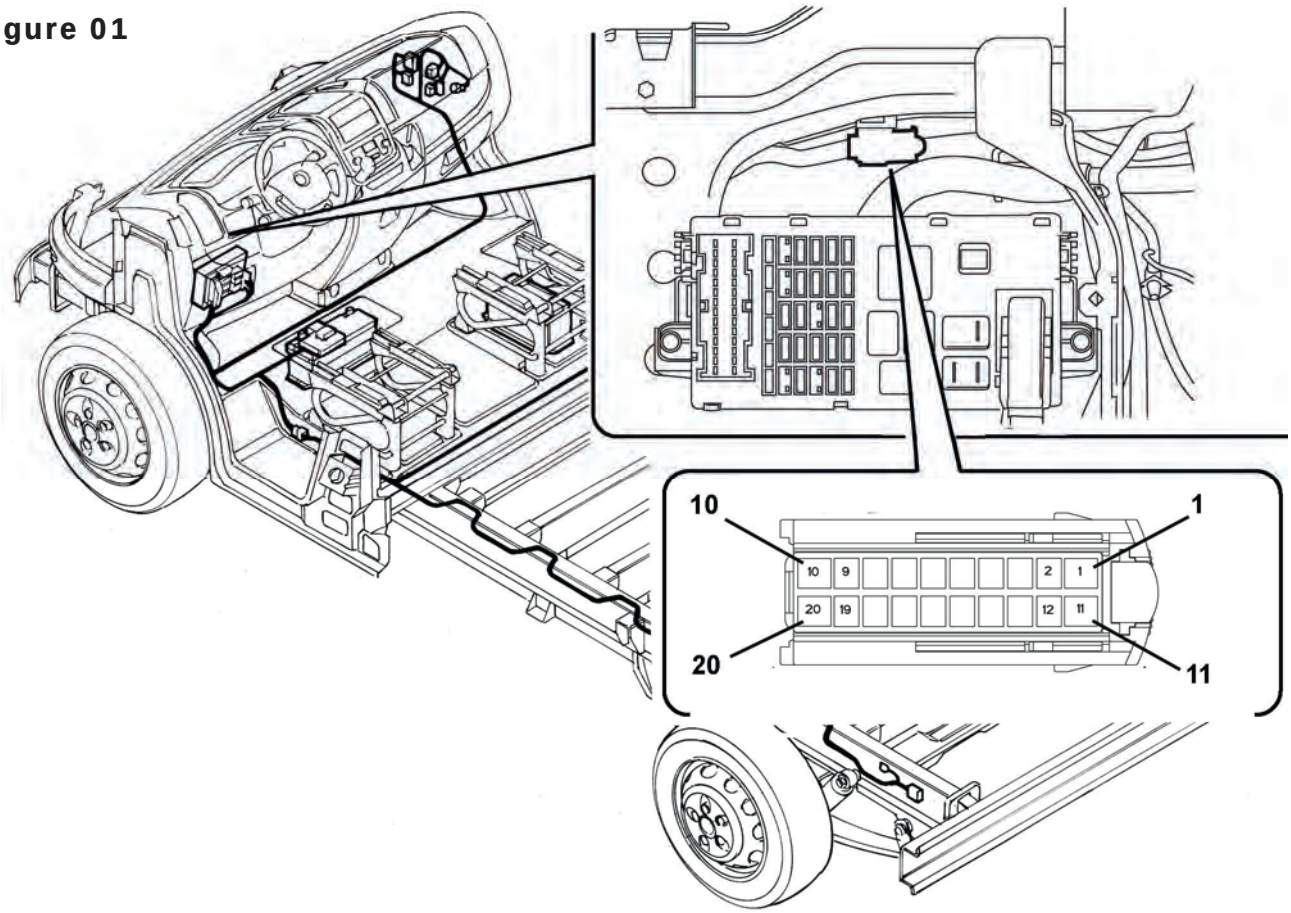
AMBULANCE CONVERSION
ELECTRICAL SYSTEM COMPONENTS



1 AMBULANCE CIRCUITRY **3.108**
1.1 20-pin connector C036 AD **3.108**
1.1.1 View and position of connector **3.108**
1.1.2 Functions of the connector **3.109**
1.1.3 Engine starting inhibition circuit **3.110**
1.1.4 Flasher power supply **3.110**
1.1.5 Siren power supply **3.111**
1.1.6 High beam lights On signal **3.112**
1.1.7 Horn control **3.112**
1.1.8 Reverse gear engaged signal **3.113**
1.2 Fiat Chrysler Automobiles S.p.A. Ambulance Control Panel **3.114**

1 AMBULANCE CIRCUITRY
1.1 20-pin connector C036 AD
1.1.1 View and position of connector

Figure 01



NOTE: In the detailed view, the connector is seen from the cable entry side

1.1.2 Functions of the connector

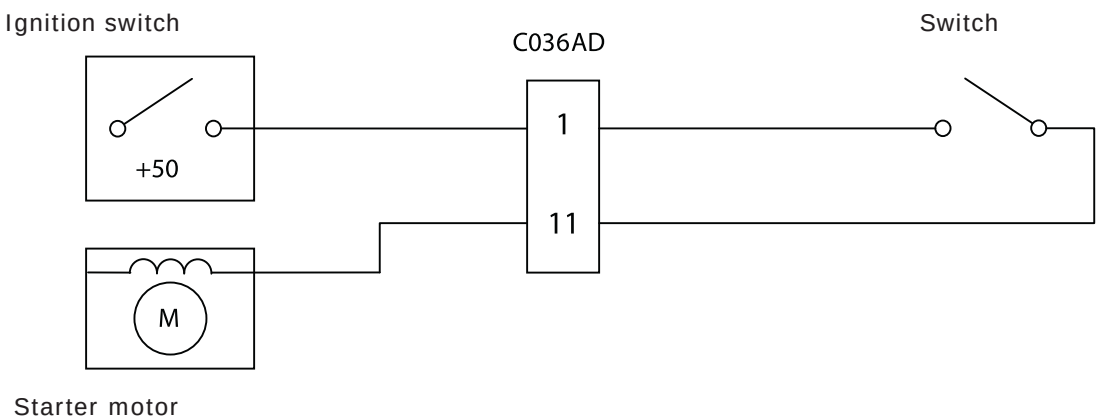
Pin	Connector function/Part number	Minimum cable size [mm²]	Notes
	Tyco 20-pin connector on vehicle side, p/n 284879-3 Counterpart on conversion side: Tyco p/n 284875-2 (supplied by Fiat Chrysler Automobiles S.p.A.)		See diagram C036-AD
1	Power supply: +50 from ignition switch	2,50	Starter relay coil command (to be short- circuited with pin 11)
2	+ key cut out during starting (Ign/SW)	0,5	Positive command for 1 standard relay (max 300mA)
3	High beam lights on signal	0,5	Positive command for 1 standard relay (max 300mA)
4	Horn control	0,35	INPUT: manages the horn relay by means of a negative signal from switch OUTPUT: negative command for 1 standard relay (max 300mA)
5	GND for ambulance control panel by Fiat Chrysler Automobiles S.p.A.	0,5	Suitable for use on other control panels (max 4A)
6	Power supply + key for backlighting of Fiat Chrysler Automobiles S.p.A. ambulance control panel	0,5	Suitable for use on other control panels (max 300mA)
7	Power supply for ambulance control panel: +30	0,5	Suitable for use on other control panels (max 2A)
8	Reverse gear engaged signal	0,5	Positive command for 1 standard relay (max 300mA)
9	Siren relay positive command (INPUT)	0,5	If the Fiat Chrysler Automobiles S.p.A. ambulance control panel is not used, provide for protection of cable sized 0.5mm² (max 7.5A fuse)
10	Siren power supply (OUTPUT)	2,50	Max 20A
11	Starter coil power supply	2,50	To be short-circuited with pin 1
12	Not connected		
13	Not connected		
14	Not connected		
15	Not connected		
16	Not connected		
17	Not connected		
18	Not connected		
19	Flasher relay positive command (INPUT)	0,5	If the Fiat Chrysler Automobiles S.p.A. ambulance control panel is not used, provide for protection of cable sized 0.5mm² (max 7.5A fuse)
20	Flasher power supply (OUTPUT)	2,50	Max 20A

1.1.3 Engine starting inhibition circuit

The ambulance connector contains a short-circuit jumper, between pin 1 and pin 11, which can be removed to cut out the starting command and produce an inhibition circuit as the need arises.

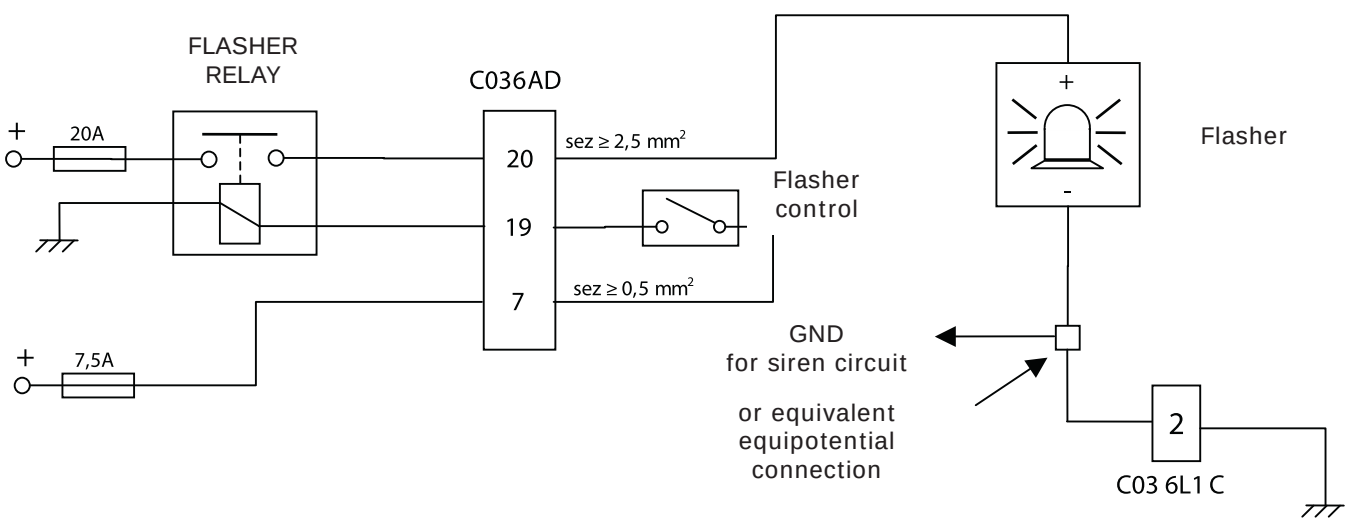
IMPORTANT: this being a circuit of primary importance, it must be installed with the greatest possible care, paying special attention to cable crimping on the cable lug.

Figure 02



1.1.4 Flasher power supply

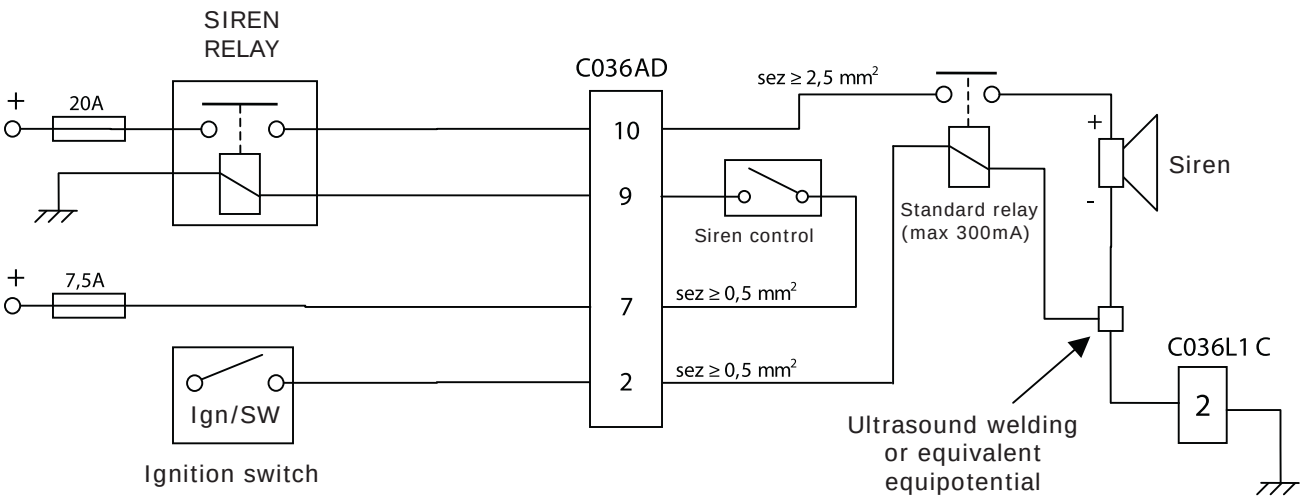
Figure 03



1.1.5 Siren power supply

If the current absorbed by the siren exceeds 5A, it is advisable to set up the power supply circuit described below so as to ensure trouble-free i.c. engine starting in critical conditions.

Figure 04



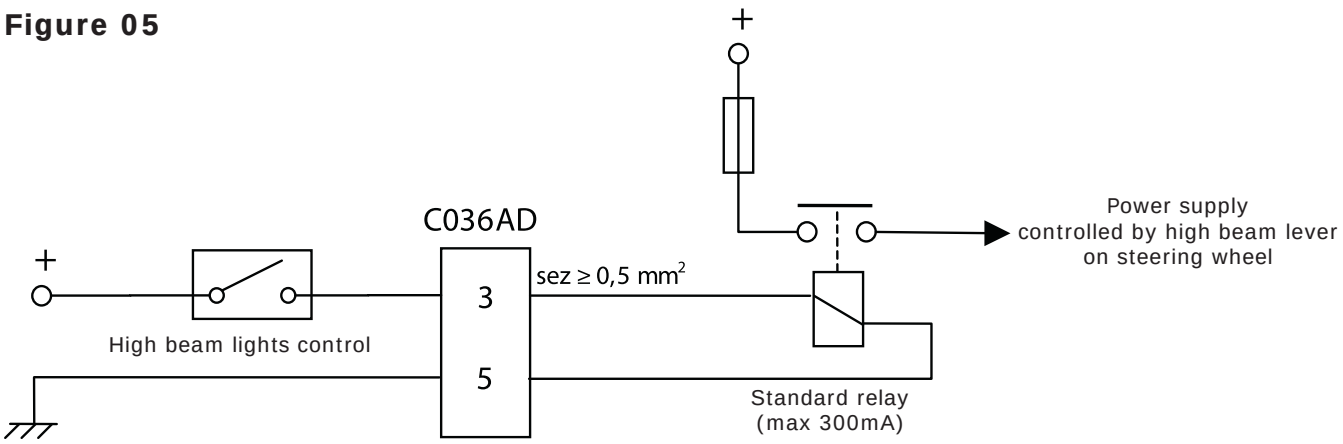
NOTES:

1. **If the Fiat Chrysler Automobiles S.p.A. ambulance control panel is used, pins 7, 9 and 19 are already connected.**
2. **Pin 7 must be used to power both (flasher and siren) controls; if these controls consist of two separate buttons, it is necessary to link them by means of ultrasound welding or make an equivalent equipotential connection on the wiring. We recommend that you do NOT use multiple crimping on the cable lugs.**
3. **If a power source other than pin 7 is used (e.g., pin 1 of connector C036L1C), the power supply circuits of the relay coils (pin 9 and pin 19) should be protected with fuses with capacity ≤ 7.5A.**

1.1.6 High beam lights On signal

This is a positive command activated when the high beam lights are turned on (including flashing mode).
A wiring diagram for this circuit is exemplified below.

Figure 05

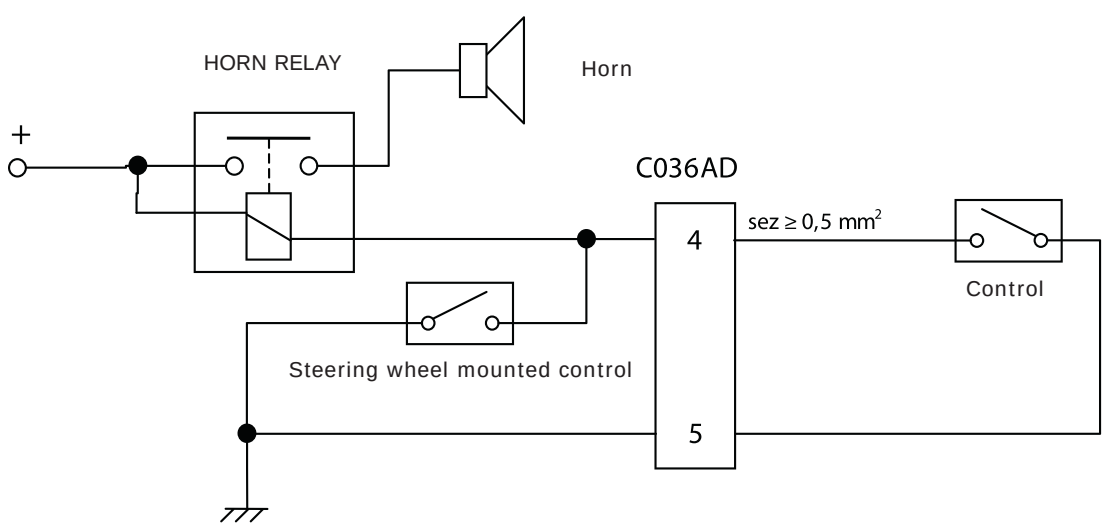


1.1.7 Horn control

Pin 4 of connector C036AD is bidirectional. This notion is illustrated in the two examples given below regarding two different operating modalities.

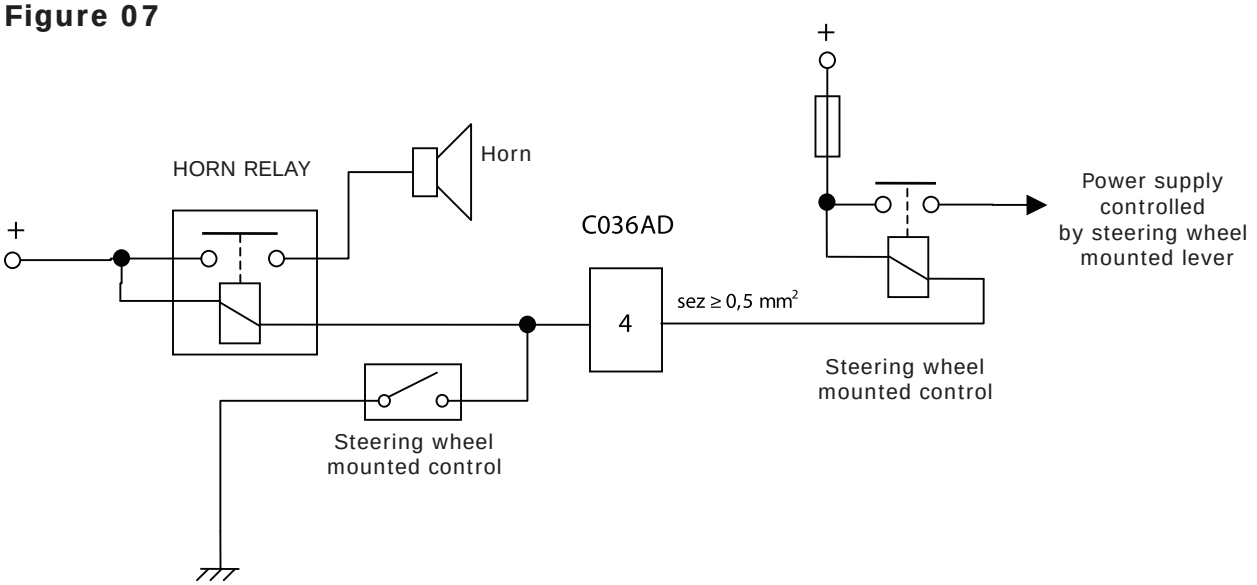
INPUT mode operation

Figure 06



OUTPUT mode operation

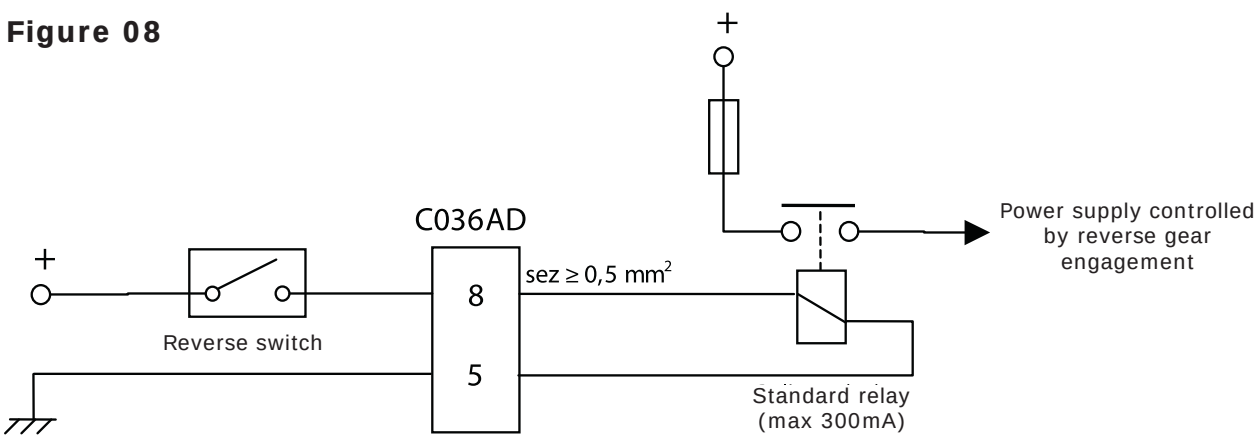
Figure 07



1.1.8 Reverse gear engaged signal

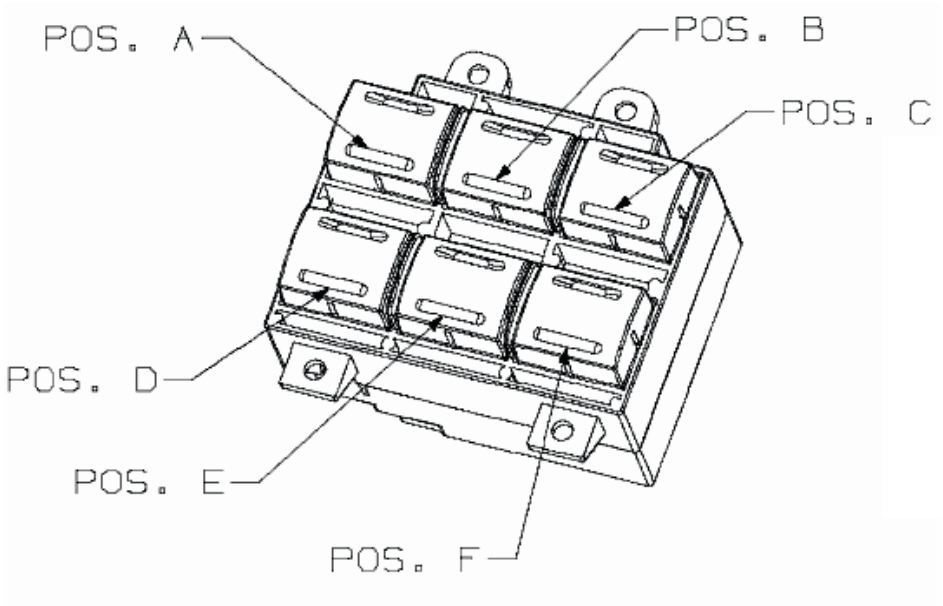
If it proves necessary to activate loads that can be powered only with the reverse gear is engaged, this can be done by installing the following circuit.

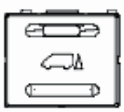
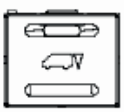
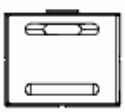
Figure 08



NOTE: When using pin 5 of connector C036AD (frame GND) for several devices (ΣI ≤ 4A), we recommend resorting to ultrasound welding or an equivalent equipotential connection. We strongly recommend that you do NOT use multiple crimping on the cable lugs.

1.2 Fiat Chrysler Automobiles S.p.A. Ambulance Control Panel

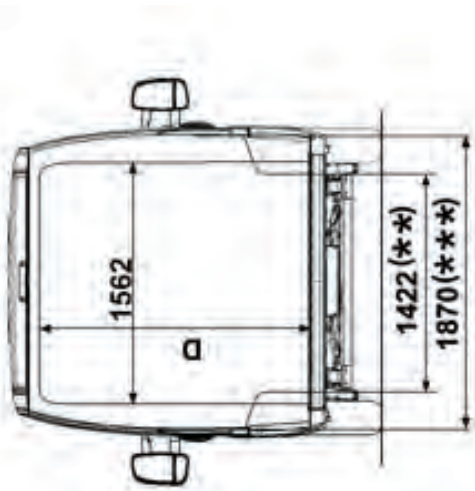


LIST OF BUTTONS				
T1	T2	T3	T5	T6
				
Susp. UP	Susp. DOWN	Plug	Beacon	Siren

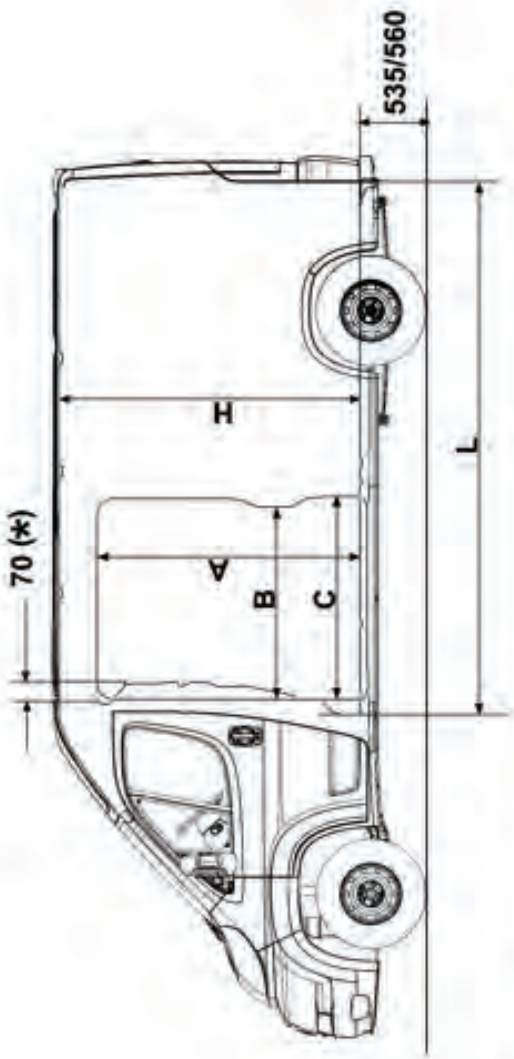
STACK COMPOSITION LIST								
CONVERSION	WIRING DIAGRAM	POSITION						
		A	B	C	D	E	F
AMBULANCE	TYPE 1	T3	T5	T6	T3	T3	T3
AMBULANCE + SELF-LEVELLING SUSP.	TYPE 1	T1	T5	T6	T2	T3	T3

MAIN DIMENSIONS

Sheet metal van – Cargo bay internal dimensions



D	
H1	1520
H2	1790
H3	2030



L	
L1	2670
L2	3120
L3	3705
L4	4070

	A	B
L1 H1	1485	1075
L2 H1	1485	1250
L2 H2	1755	1250

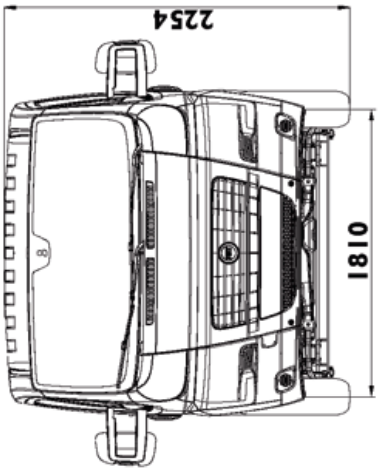
H	
H1	1662
H2	1932
H3	2172

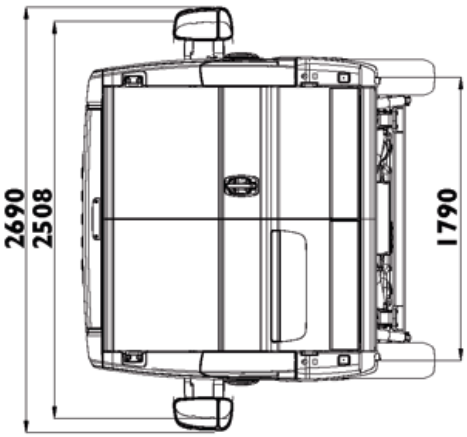
(*) Bulkhead intrusion

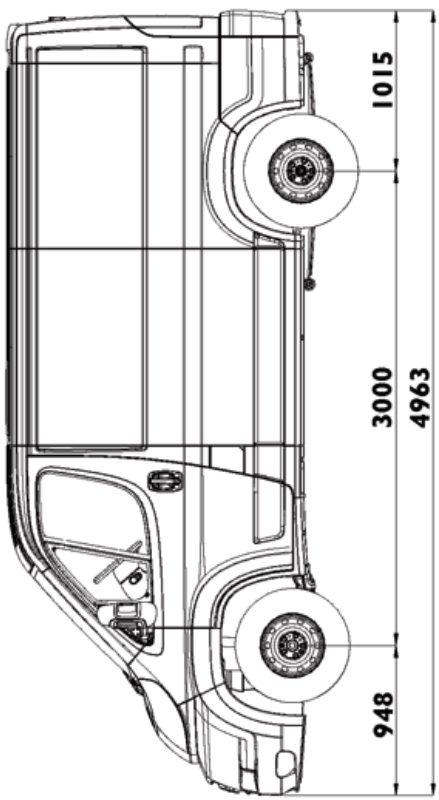
(**) Width between wheelarches

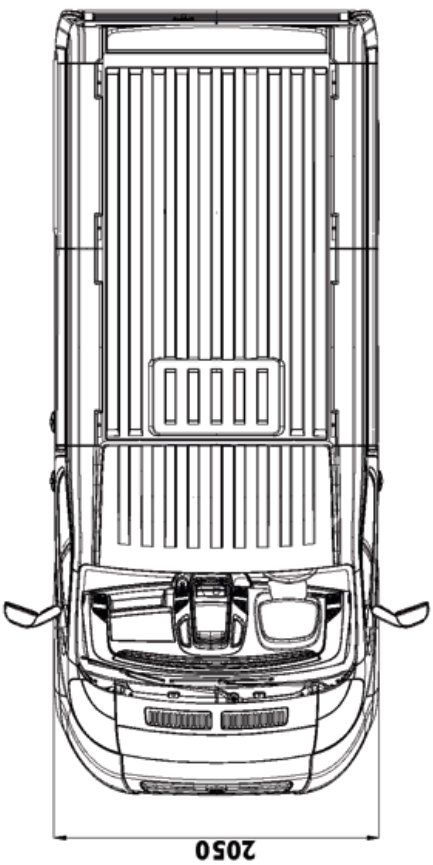
(***) Width between internal sides (against panelling)

Sheet metal van – Short wheelbase H1

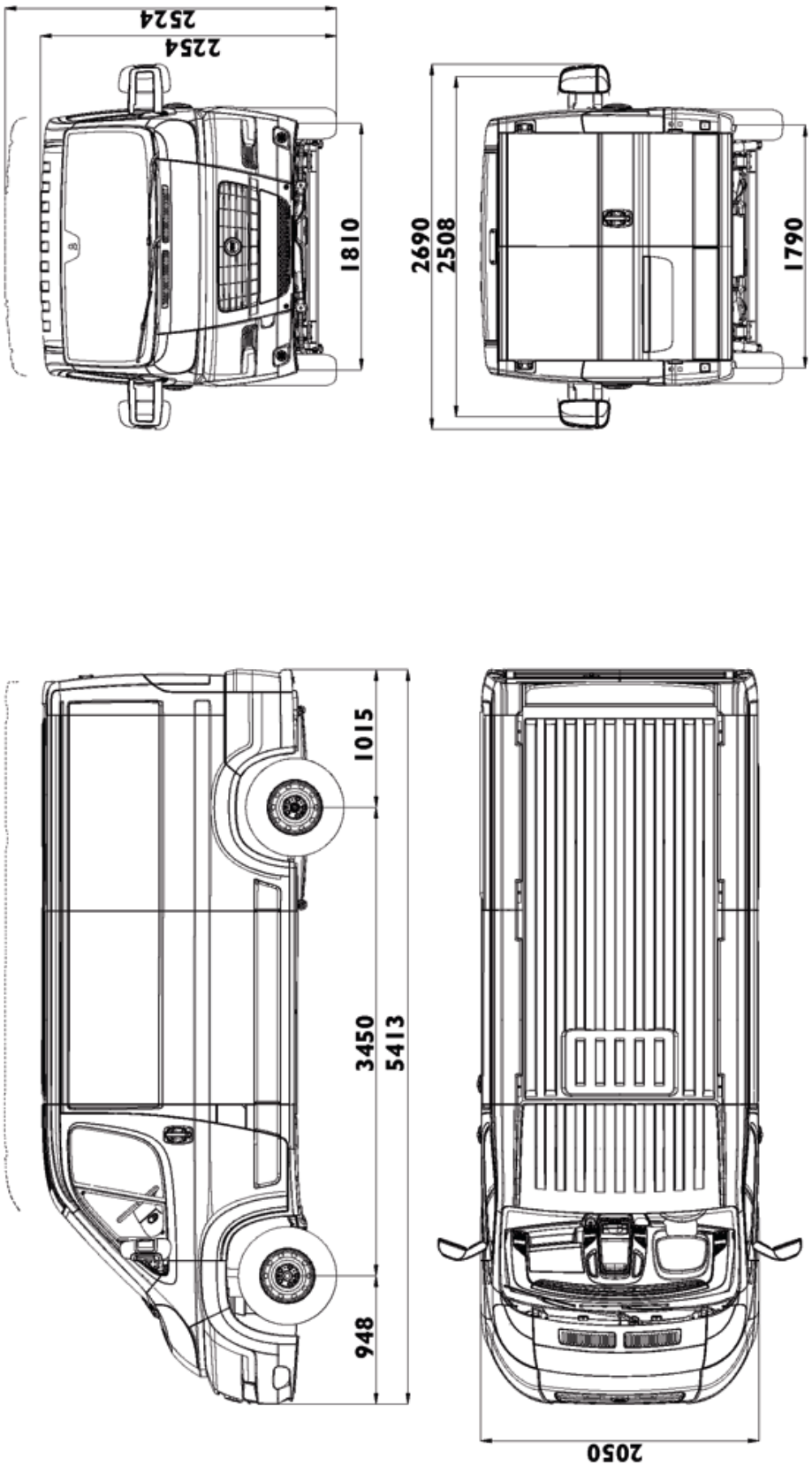




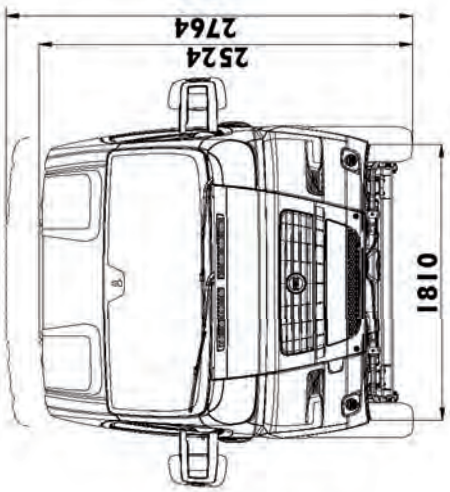


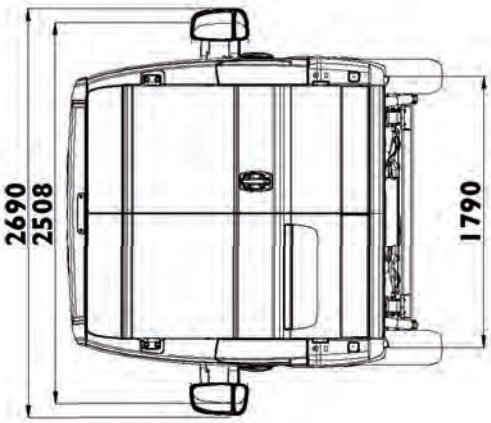


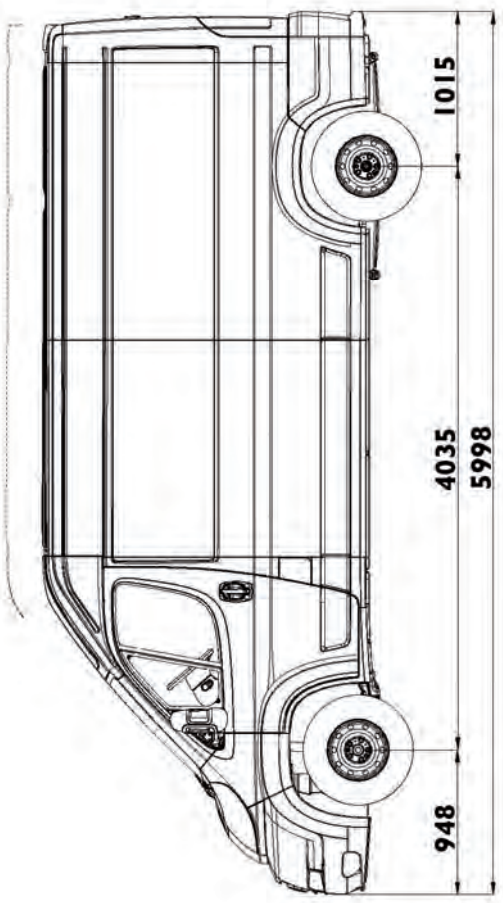
Sheet metal van – Medium wheelbase H1 / H2

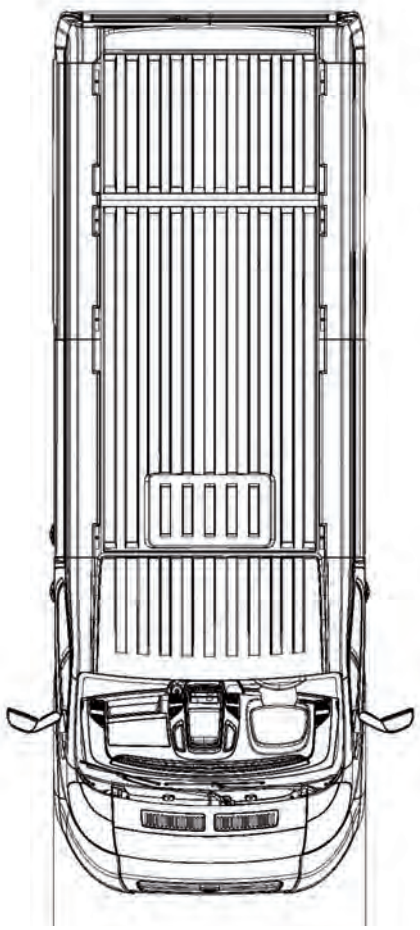


Sheet metal van – Long wheelbase H2 / H3

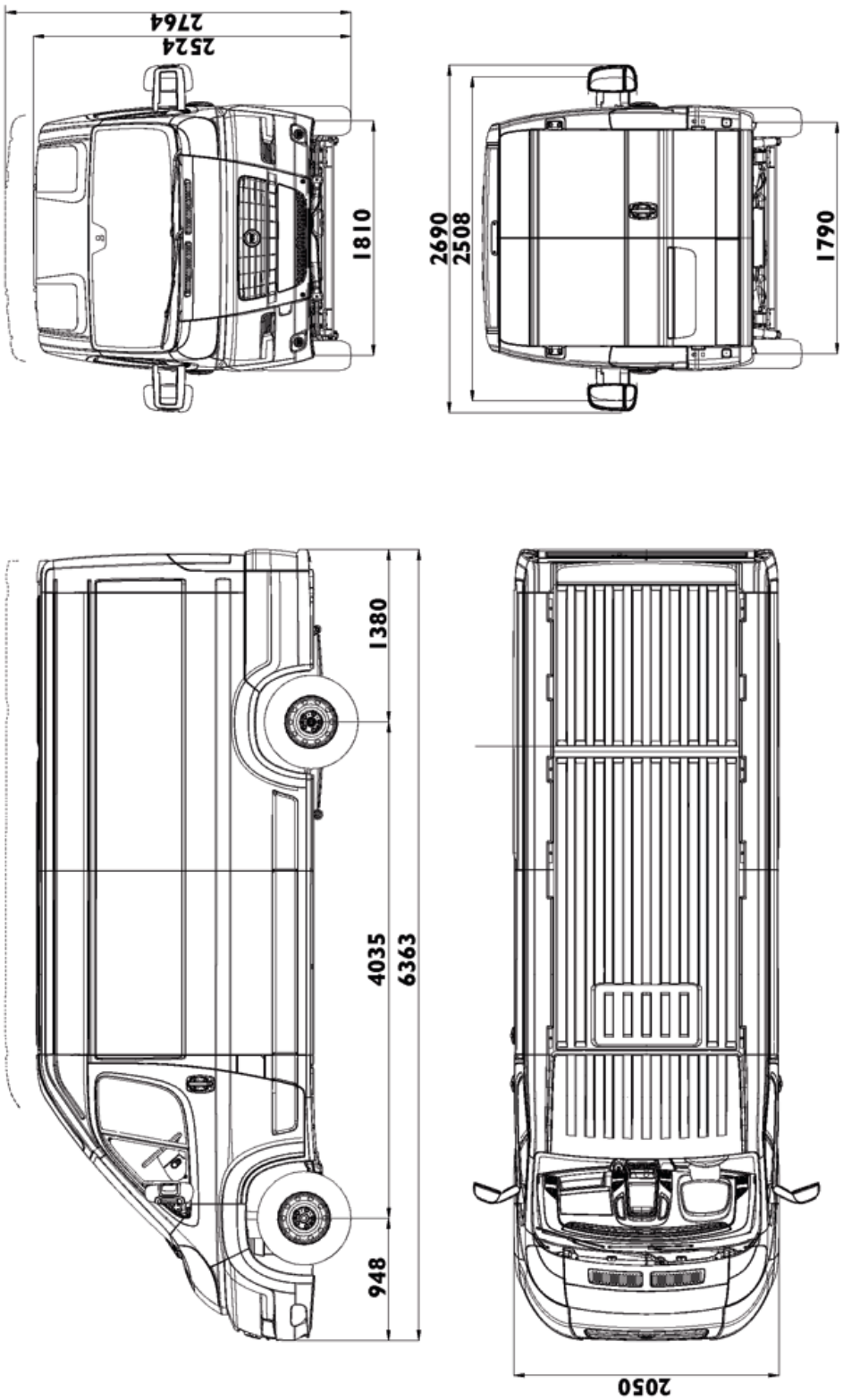




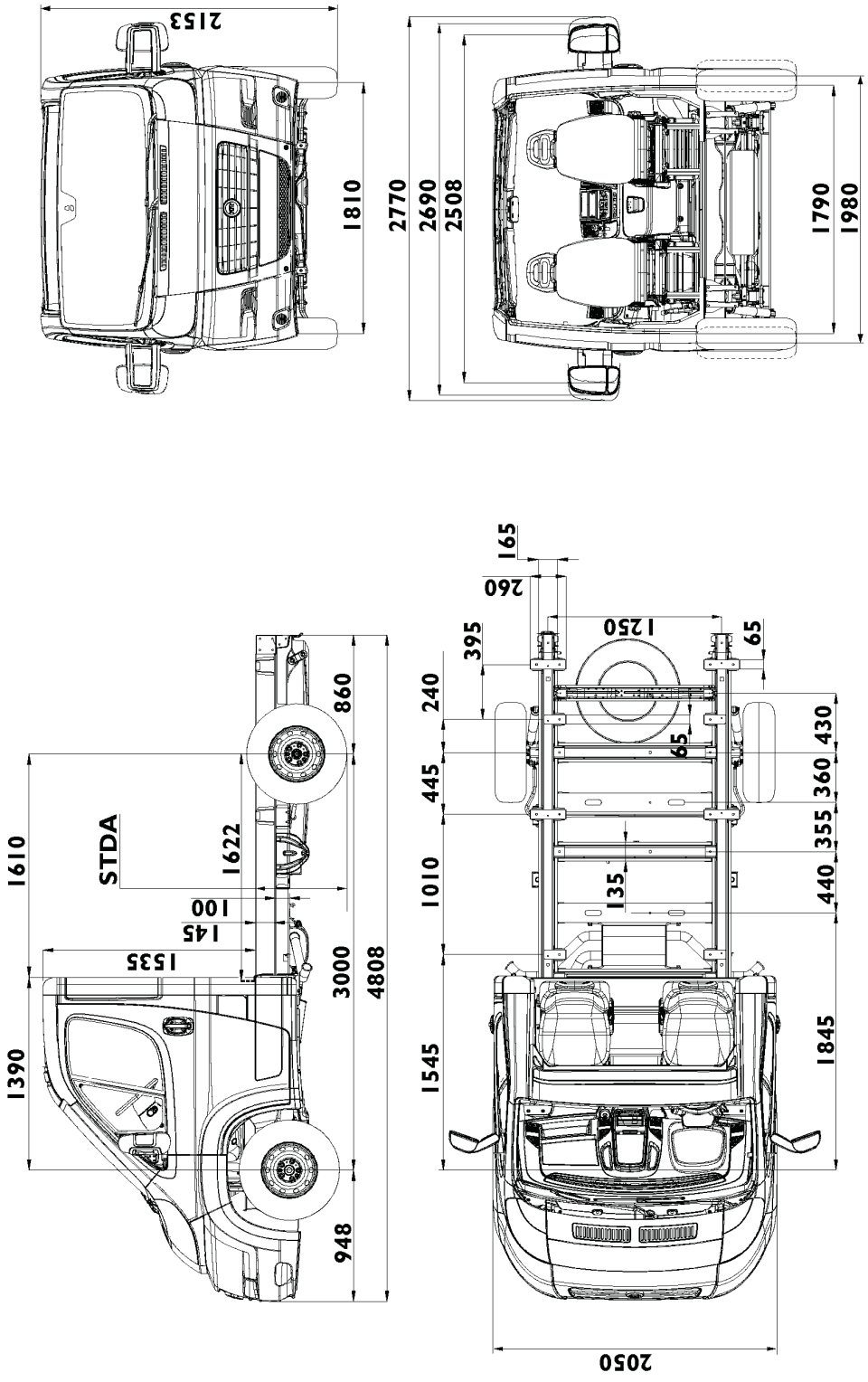




Sheet metal van – Extra-long overhang H2 / H3

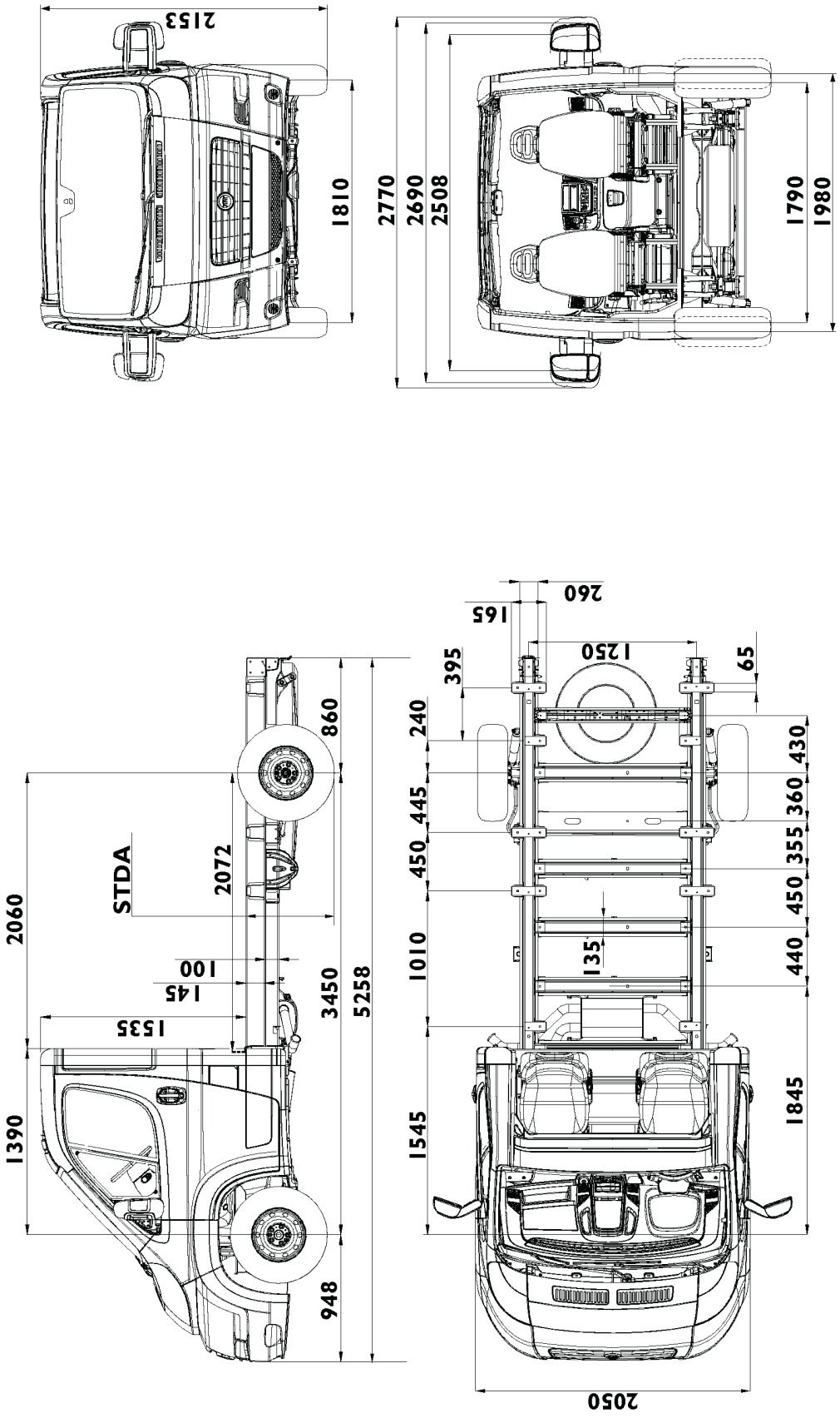


Short wheelbase chassis cab



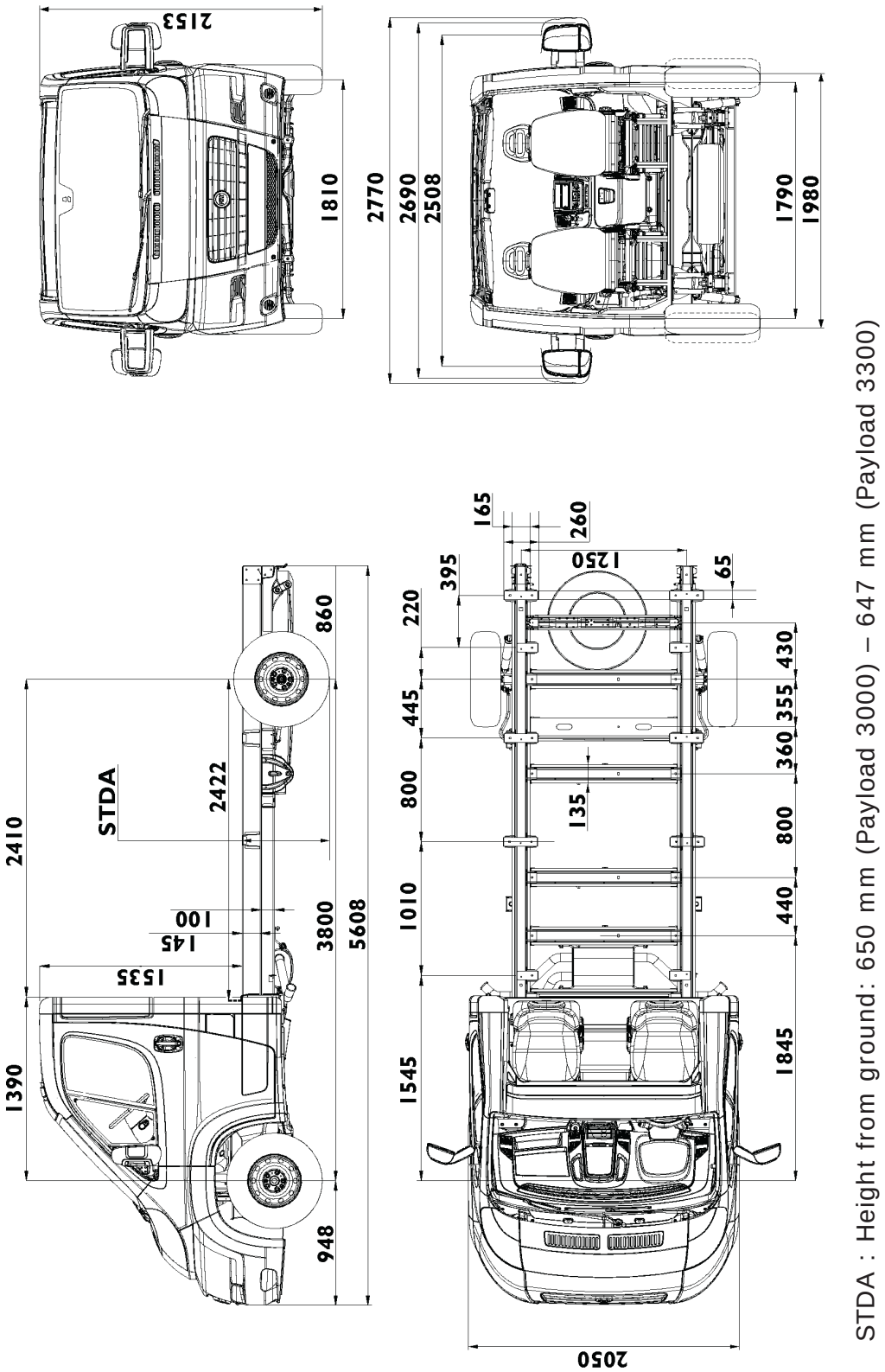
STDA: Height from ground: 650 ± 3 mm

Medium wheelbase chassis cab



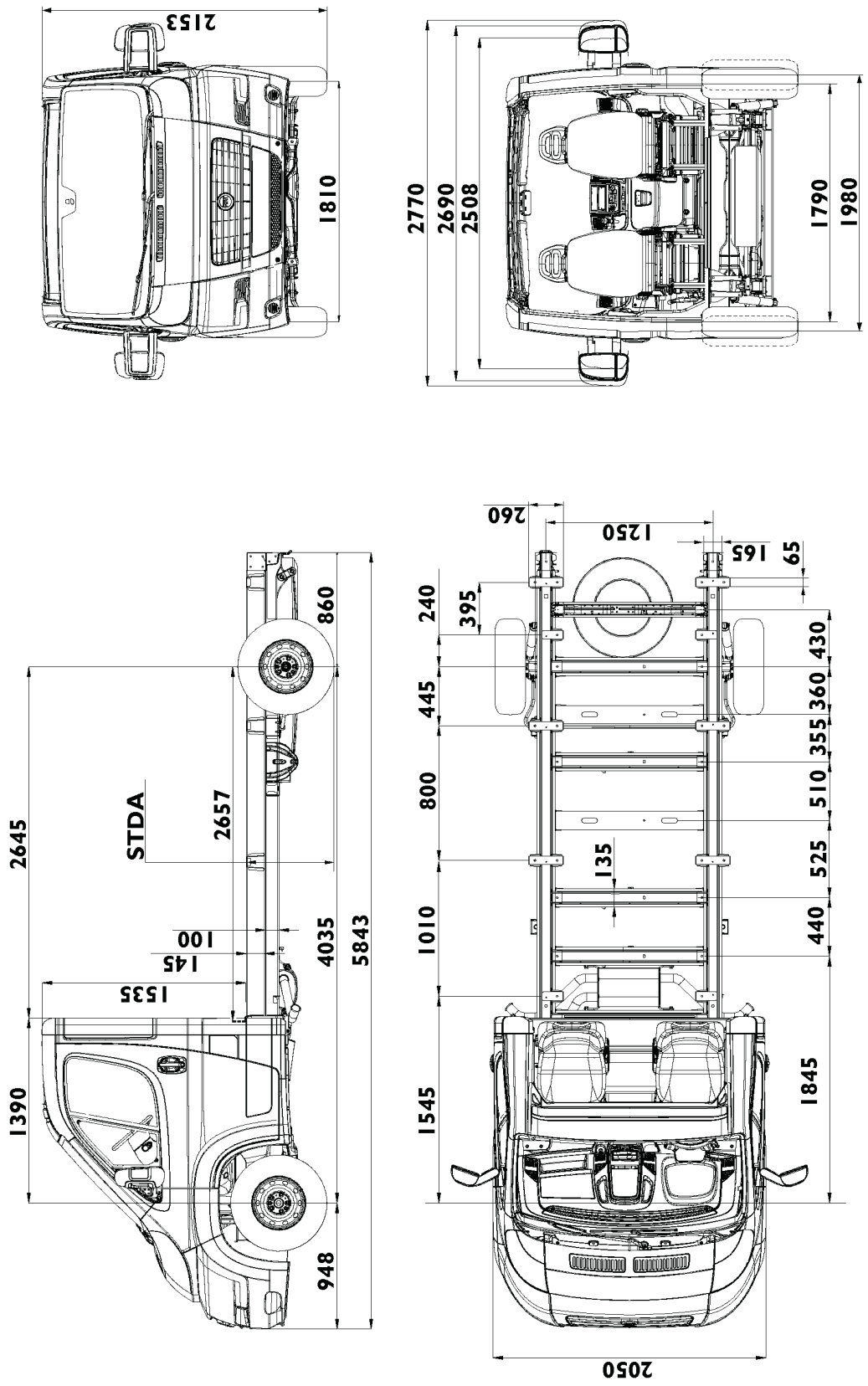
STDA: Height from ground: 646 ± 3 mm

Medium-long wheelbase chassis cab



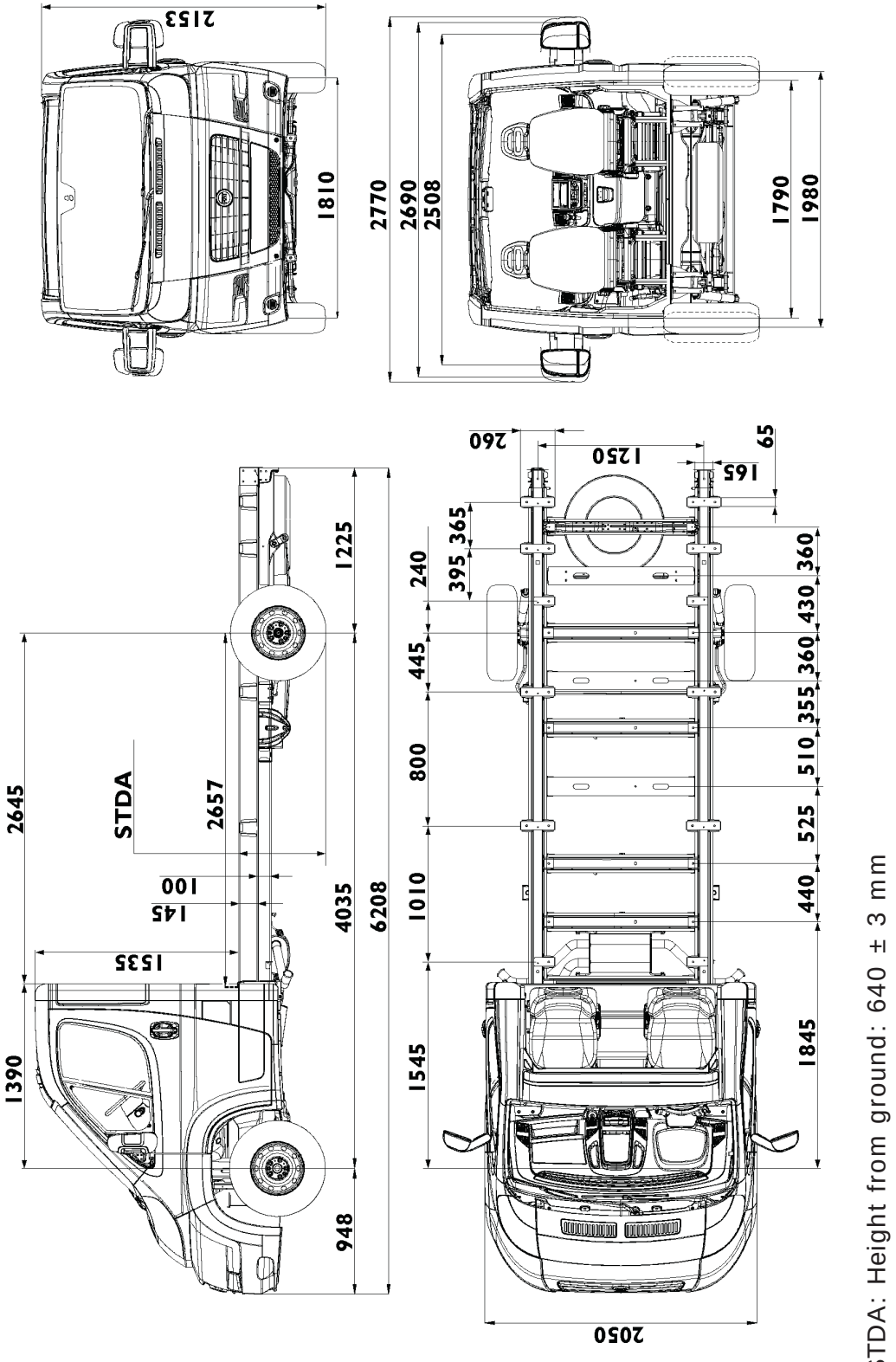
STDA : Height from ground: 650 mm (Payload 3000) – 647 mm (Payload 3300)
645 mm (Payload 3500)

Long wheelbase chassis cab



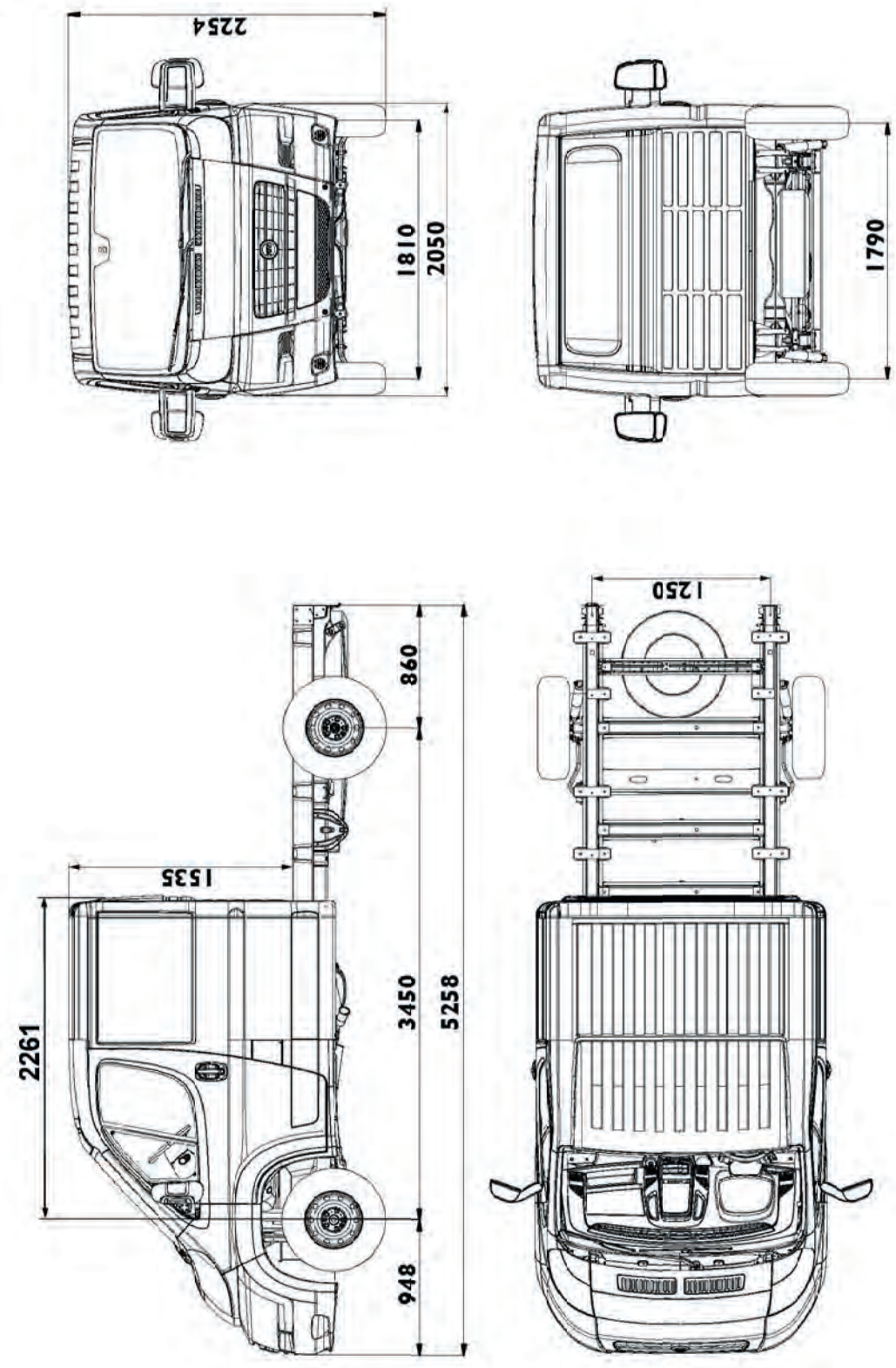
STDA: Height from ground: 642 ± 3 mm

Extra-long overhang chassis cab

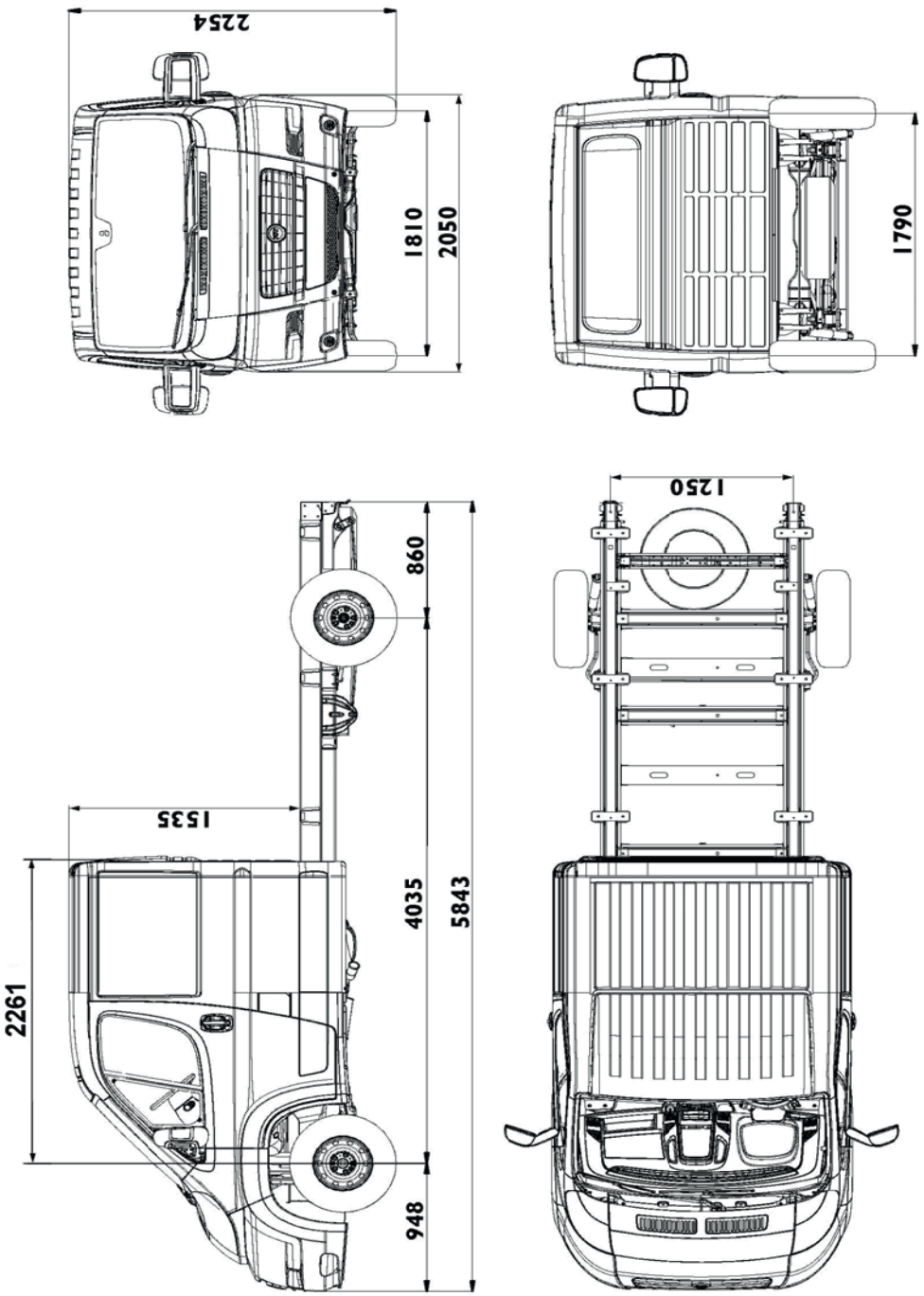


STDA: Height from ground: 640 ± 3 mm

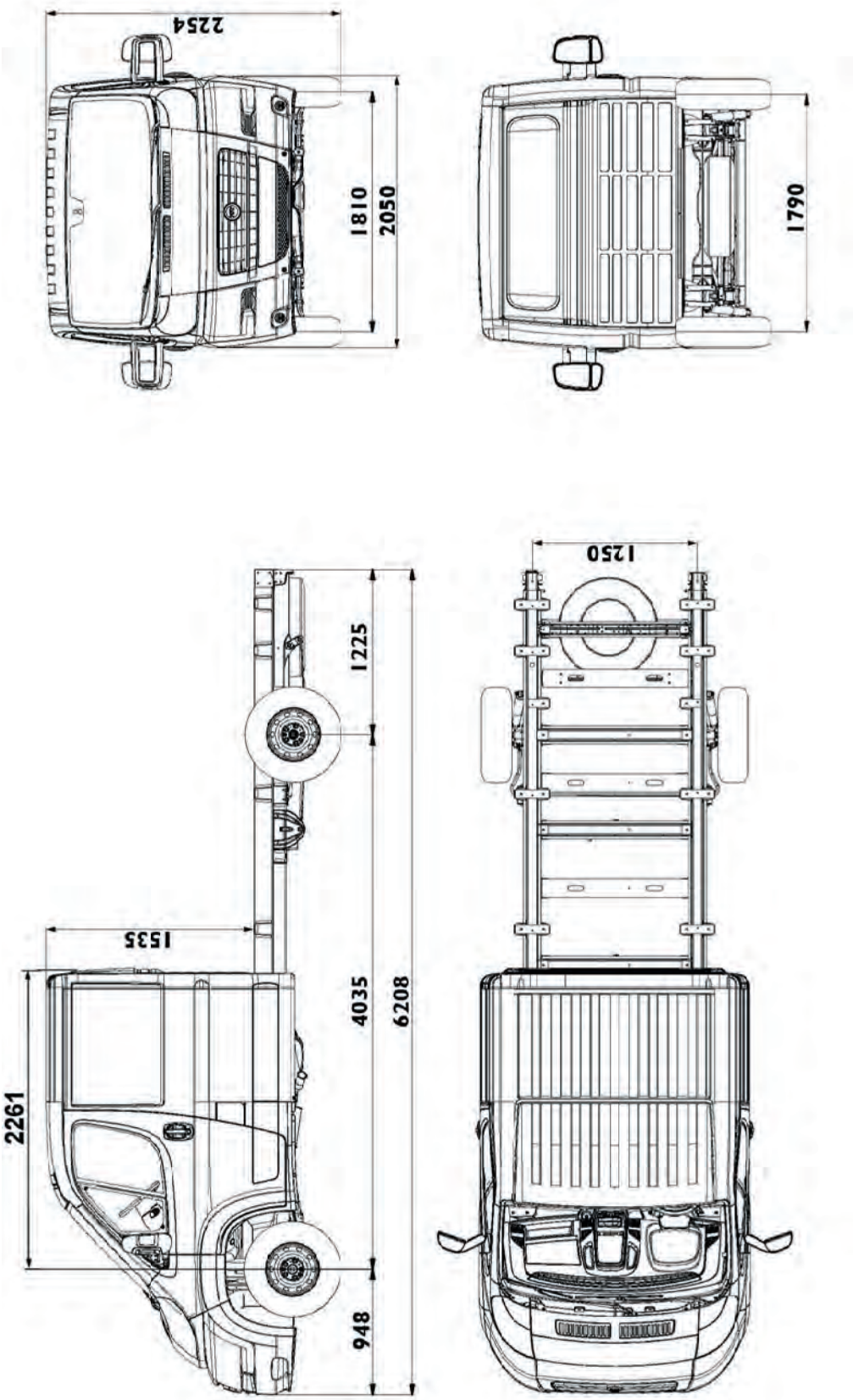
Double cab medium wheelbase chassis cab



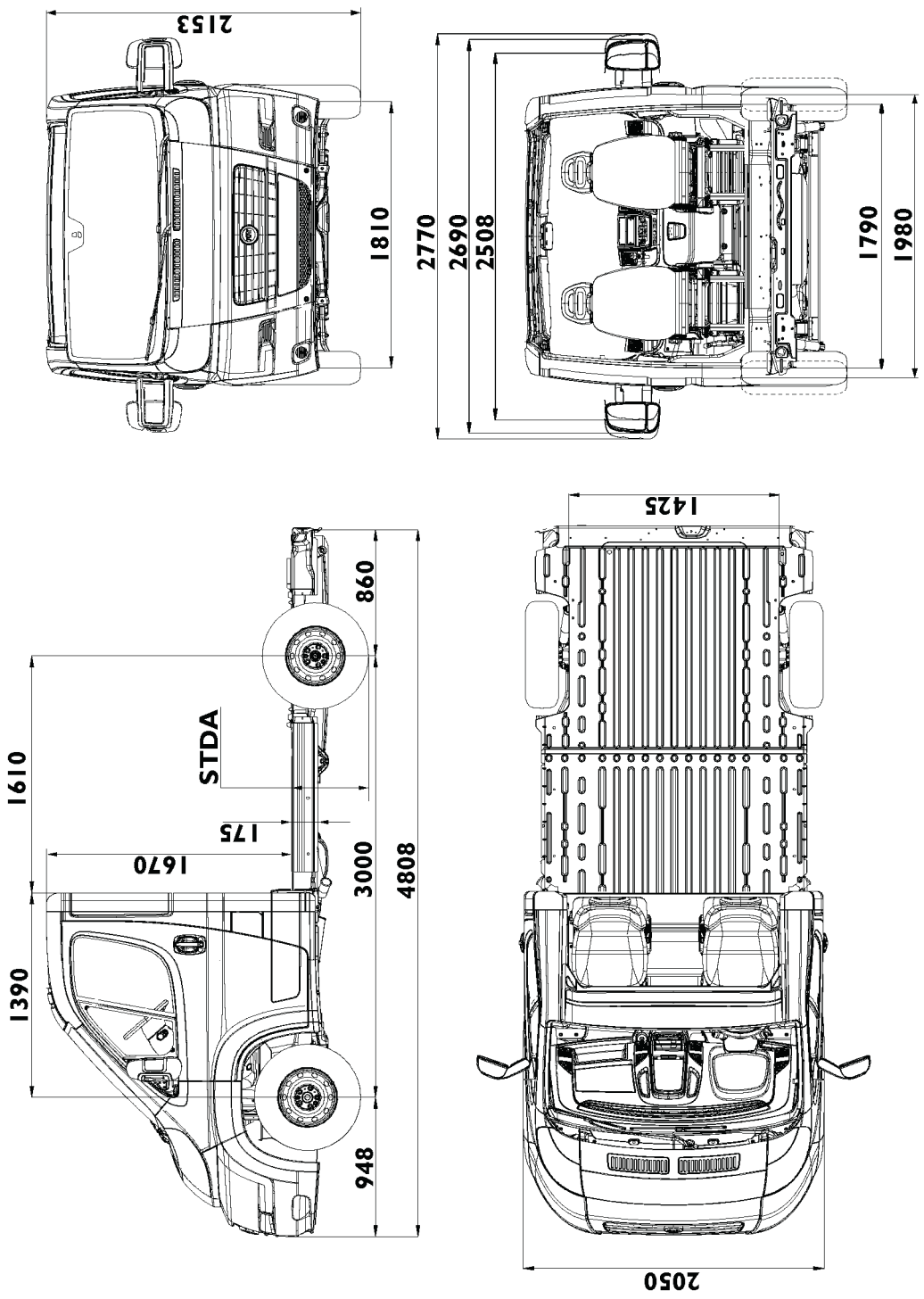
Double cab long wheelbase chassis cab



Double cab extra long overhang chassis cab

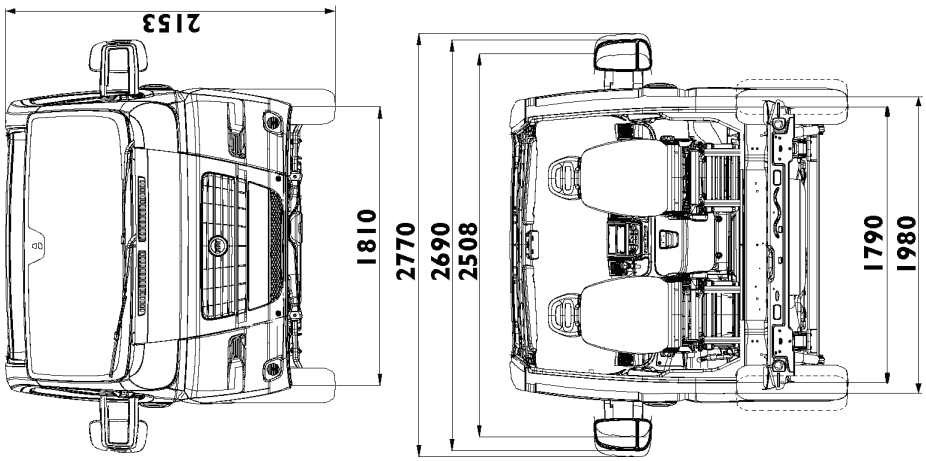


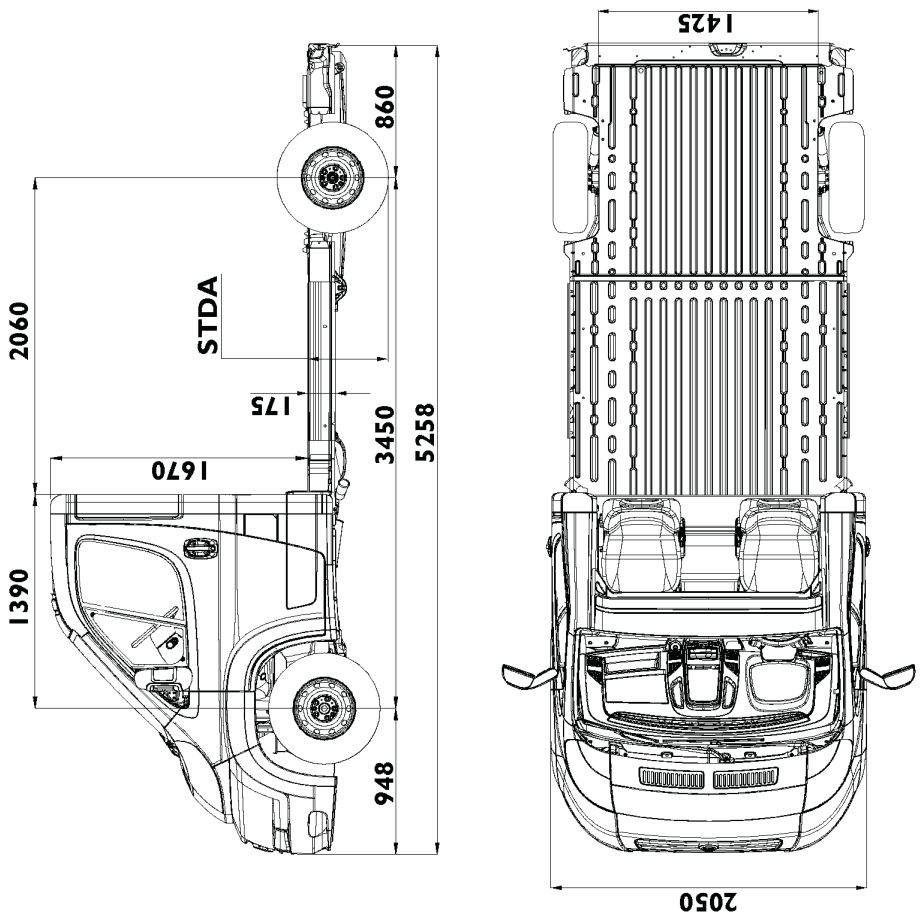
Short wheelbase chassis cab with platform



STDA: Height from ground: 536 ± 1 mm

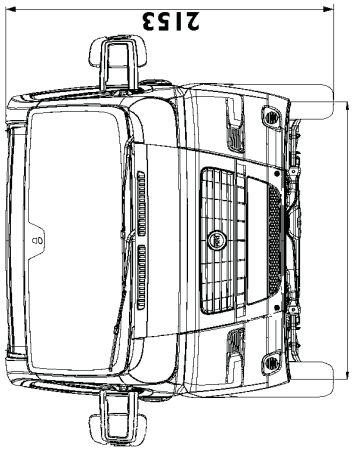
Medium wheelbase chassis cab with platform

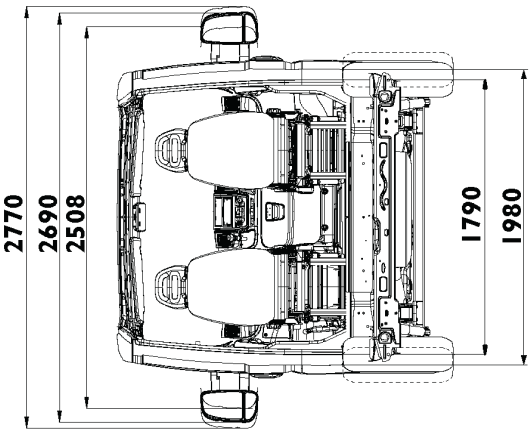


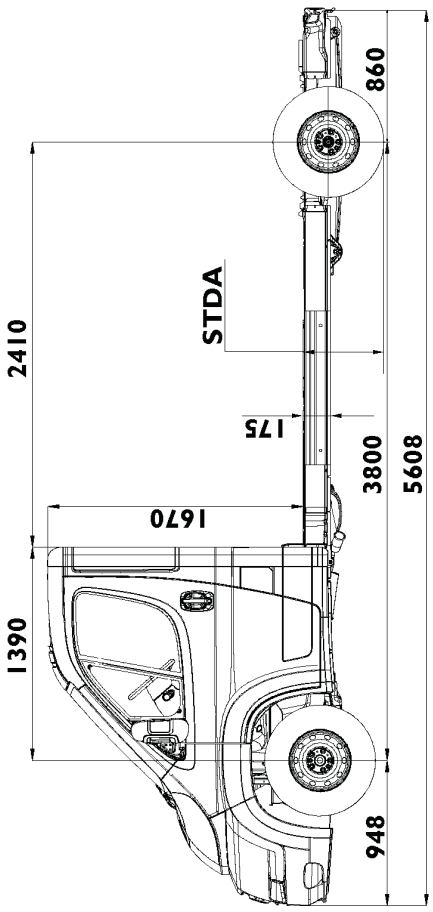


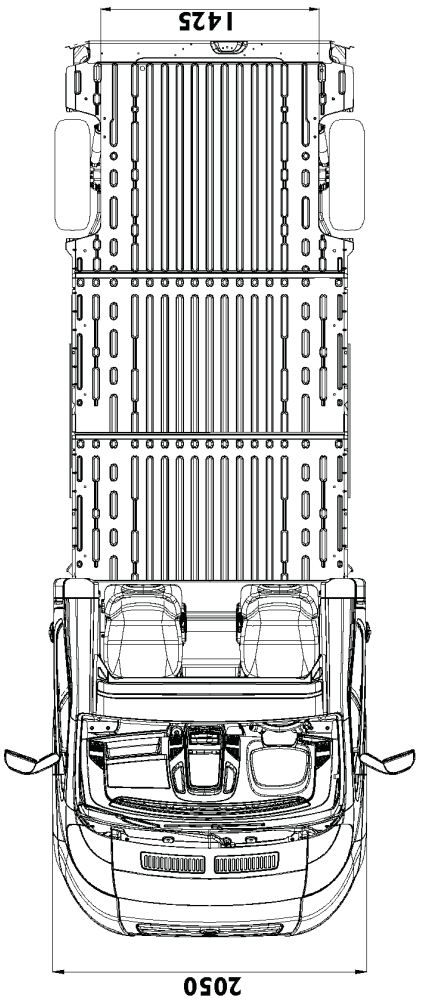
STDA: Height from ground: 545 mm (Payload 3000)

Medium-long wheelbase chassis cab with platform



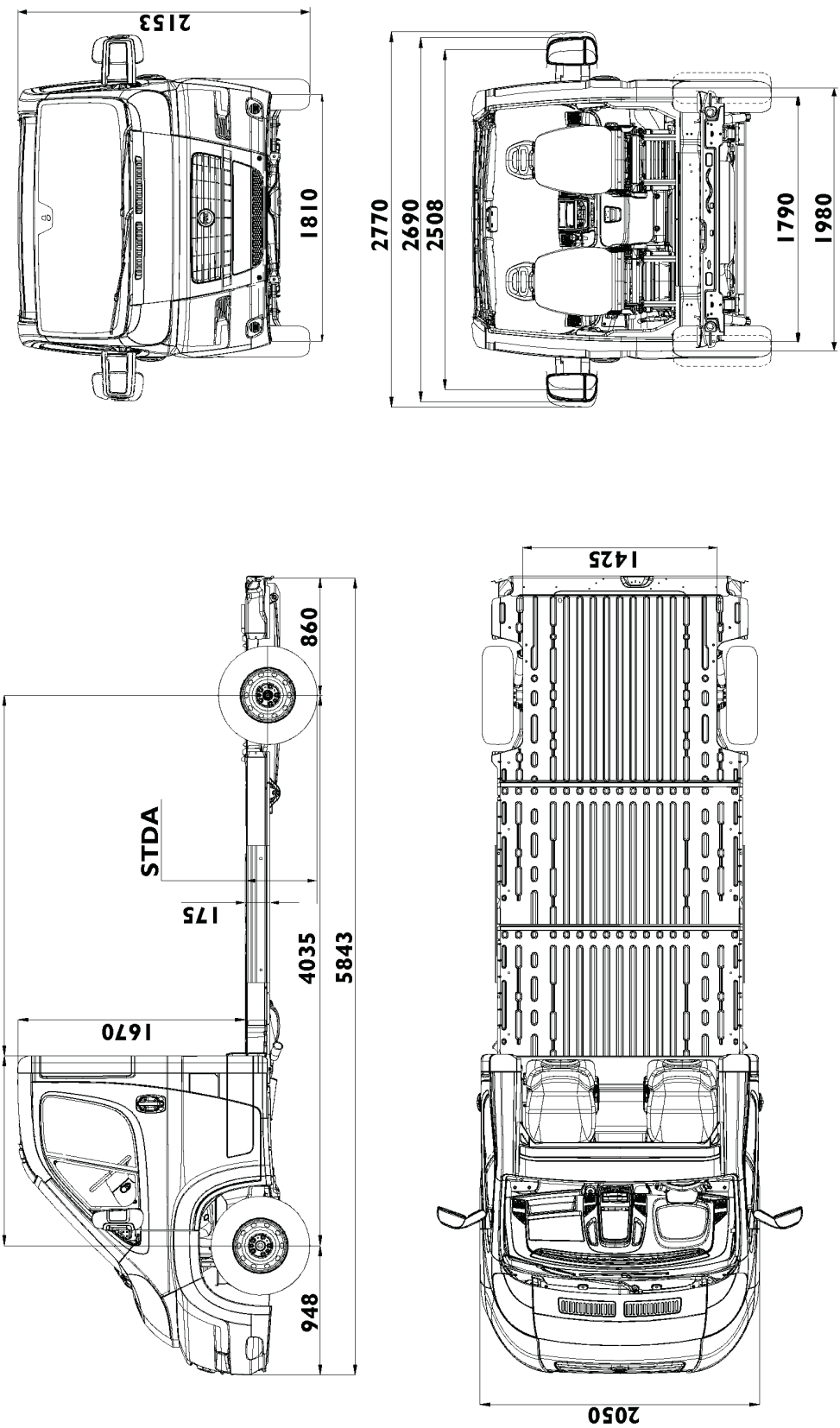






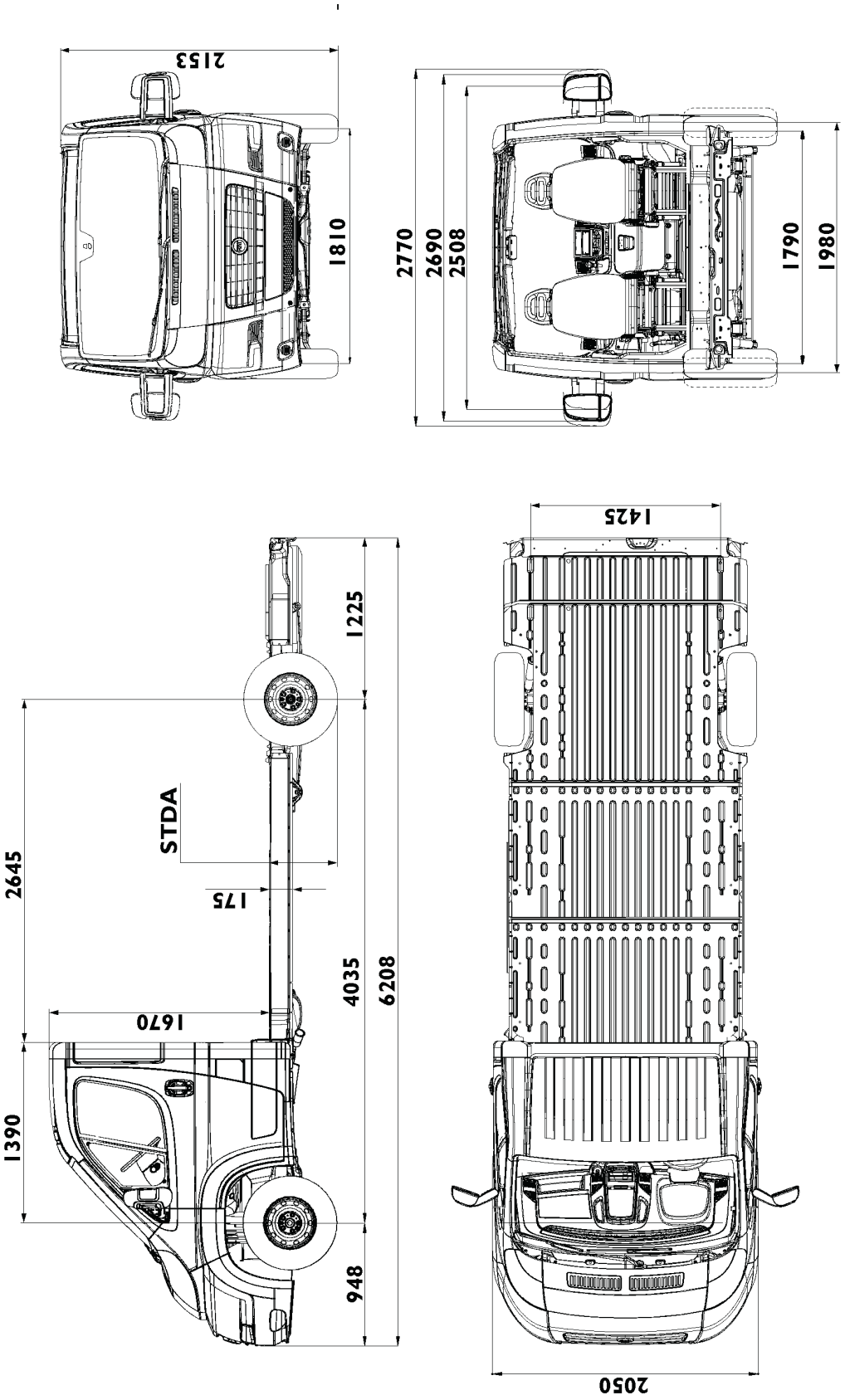
STDA: Height from ground: 550 mm (Payload 3000)
521 ± 1 mm (Payload 3300 and 3500)

Long wheelbase chassis cab with platform



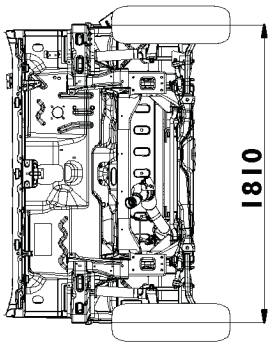
STDA: Height from ground: 518 ± 2 mm

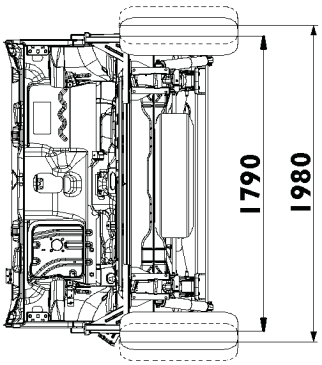
Extra-long overhang chassis cab with platform

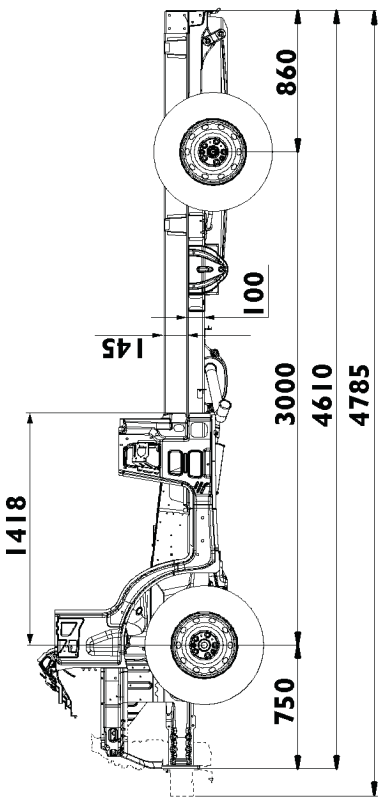


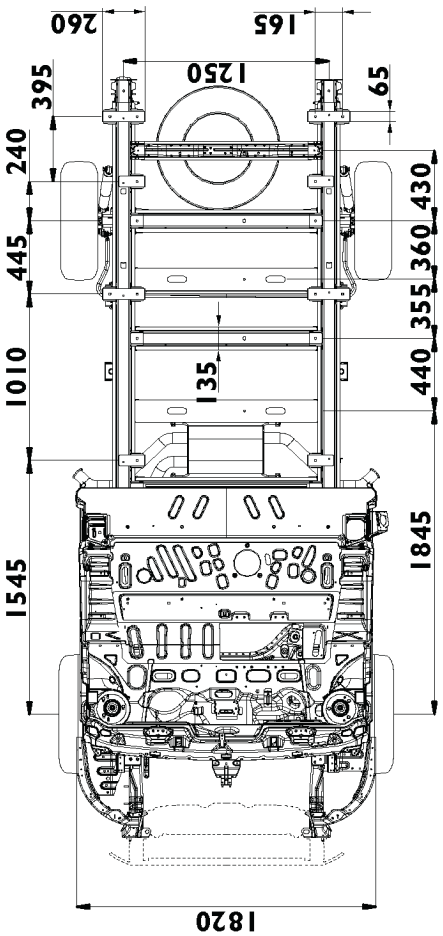
STDA: Height from ground: 521 ± 1 mm

Short wheelbase basic chassis

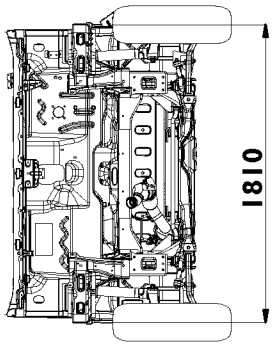


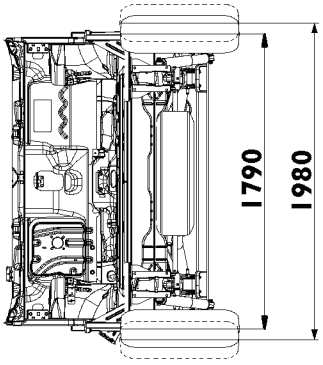


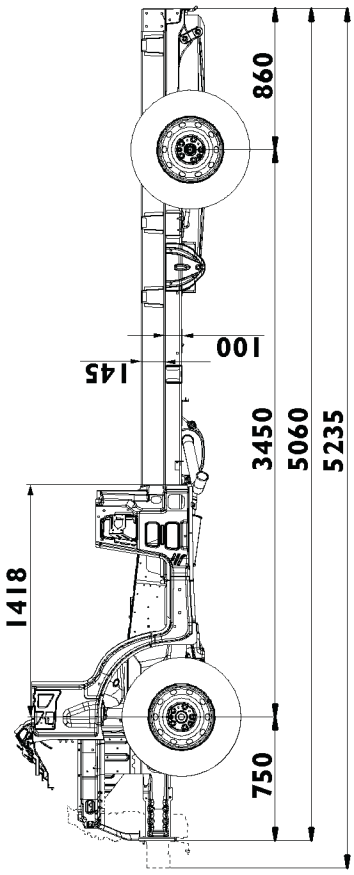


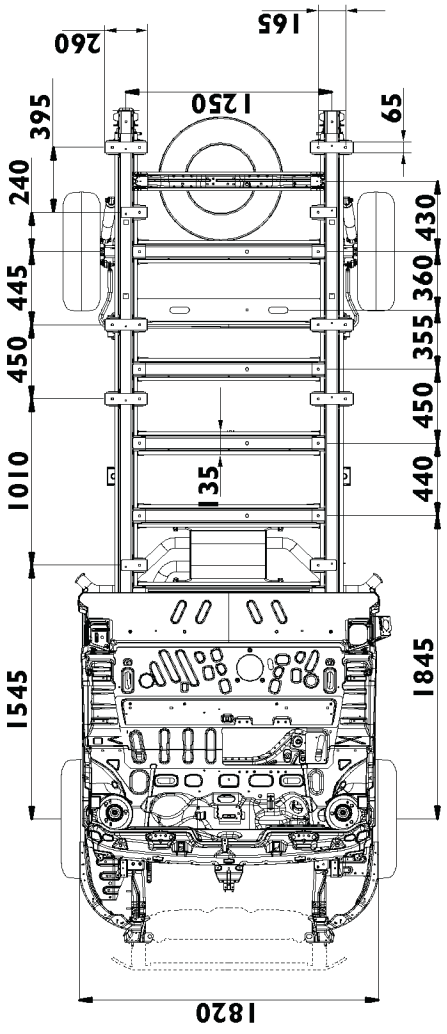


Medium wheelbase basic chassis

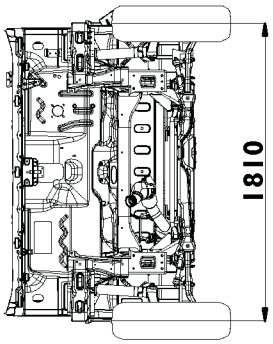


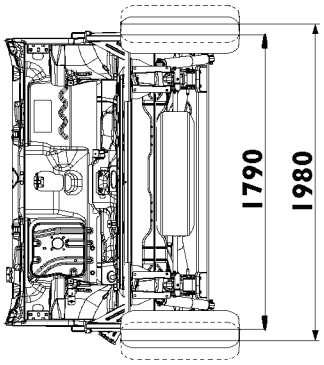


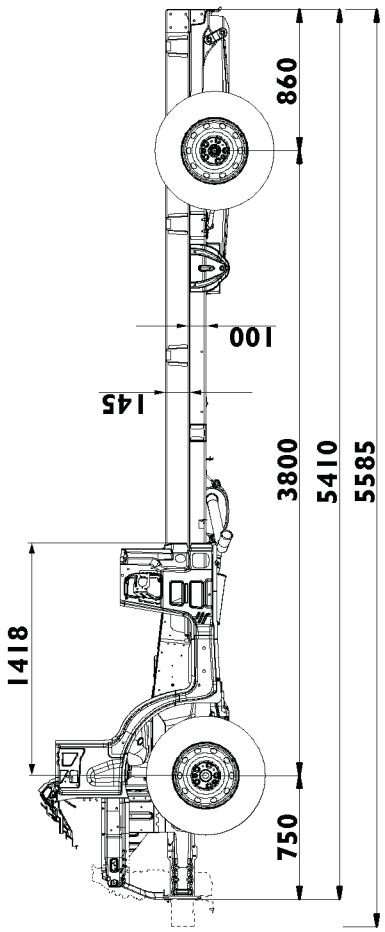


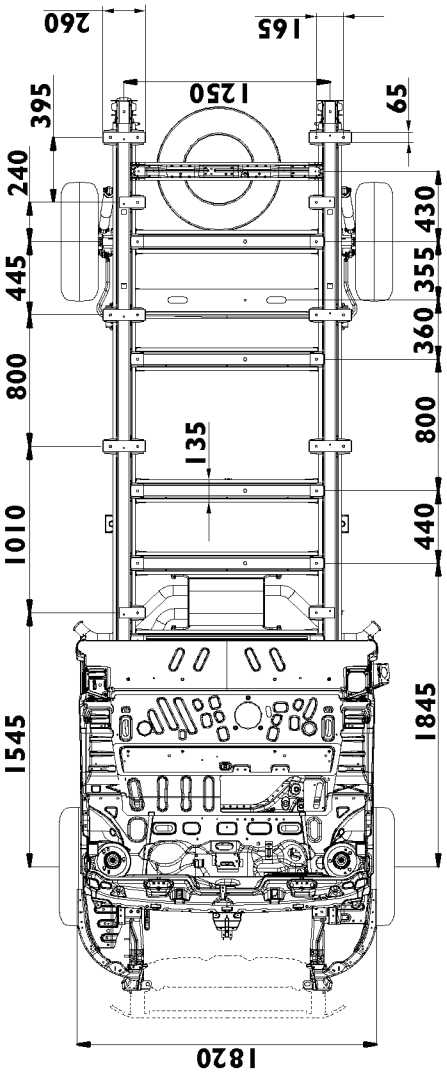


Medium-long wheelbase basic chassis

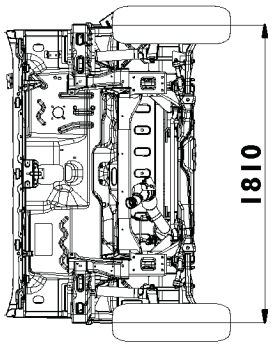


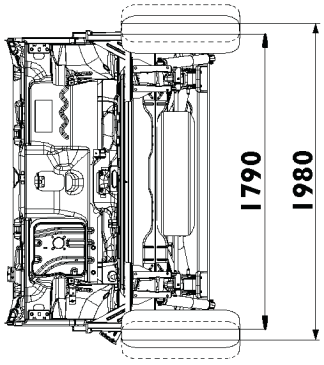


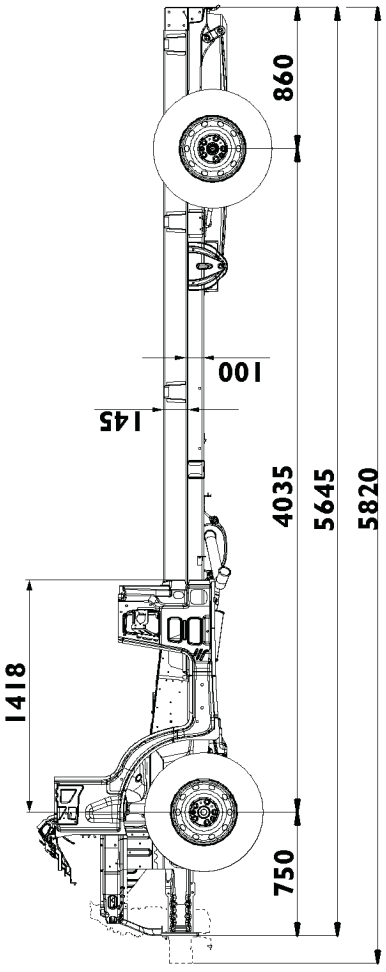


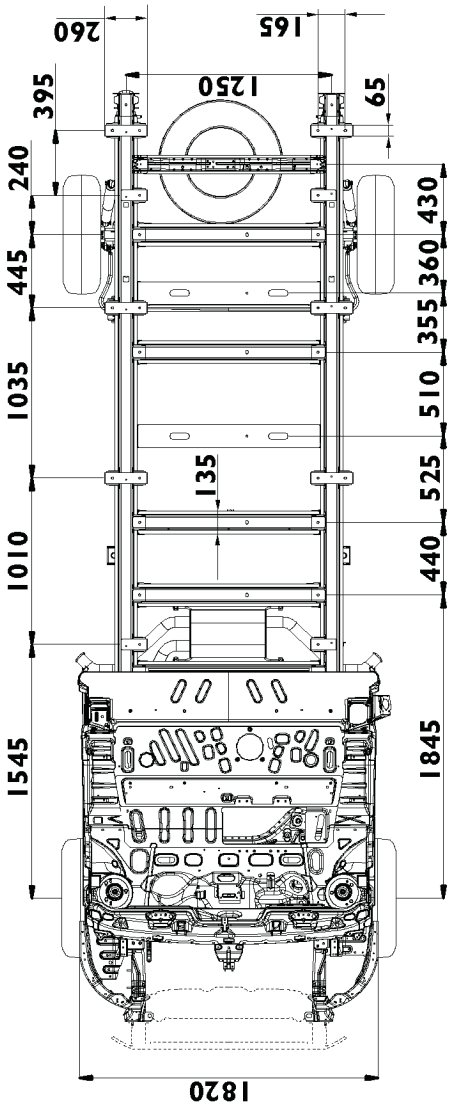


Long wheelbase basic chassis

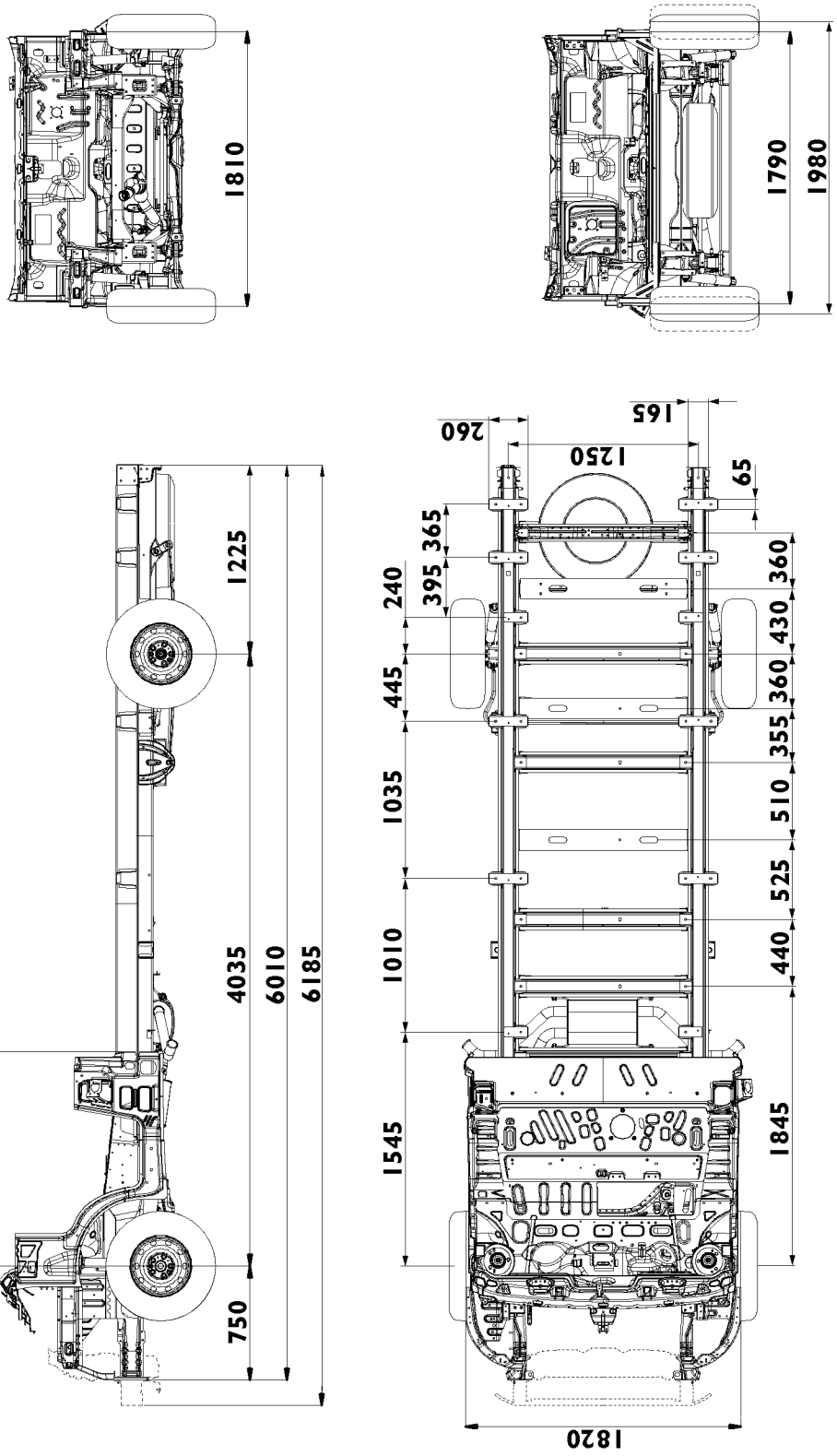




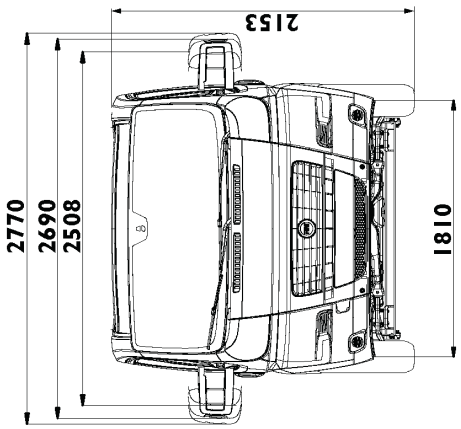


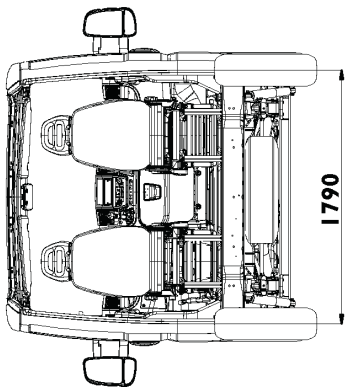


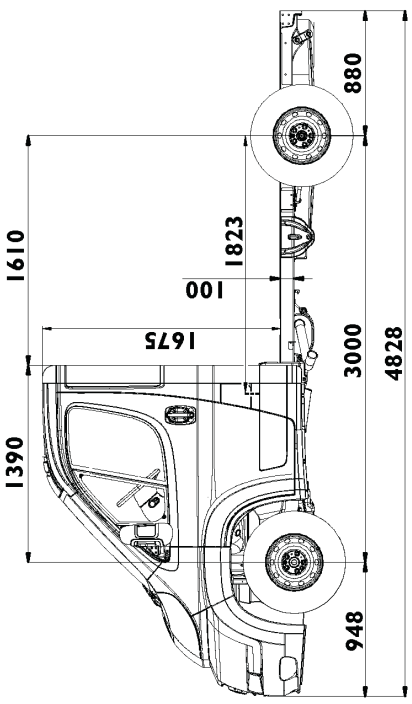
Extra-long overhang basic chassis

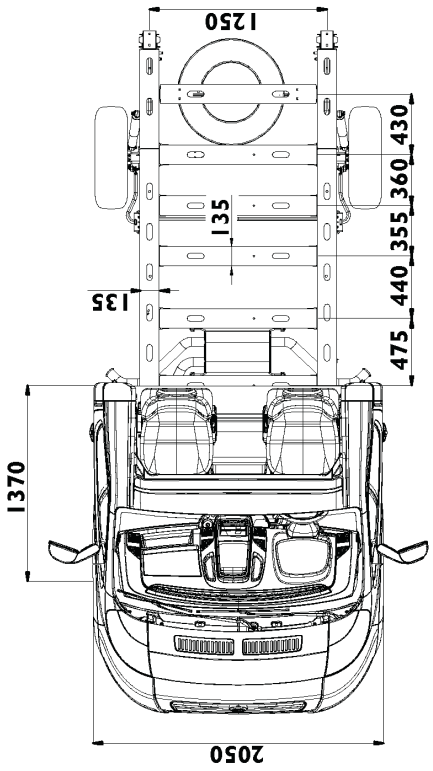


Short wheelbase special chassis cab

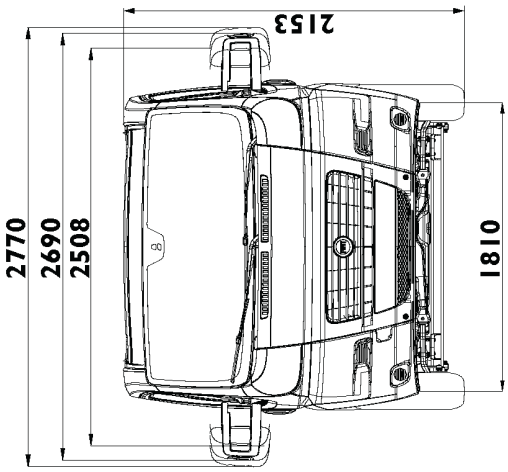


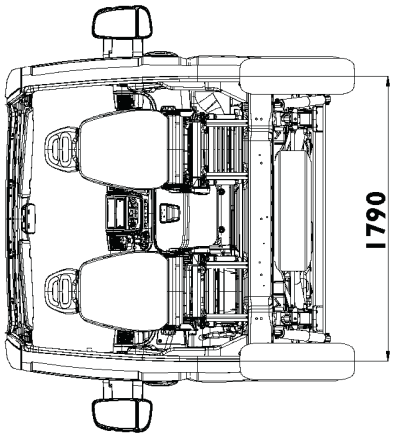


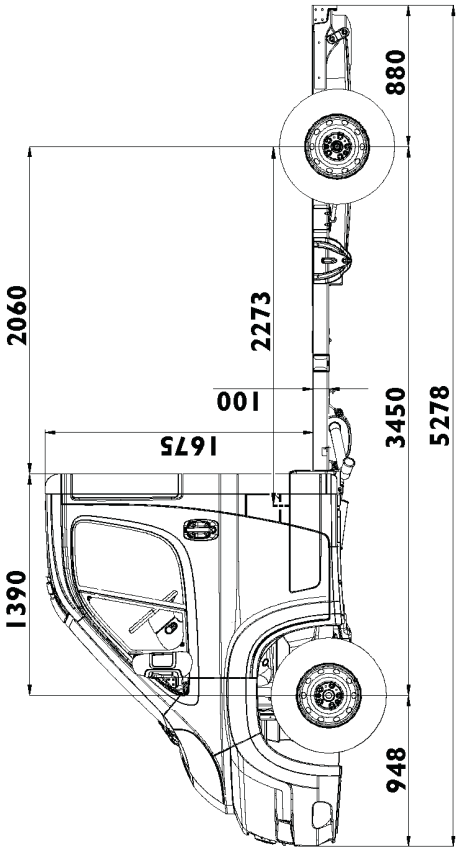


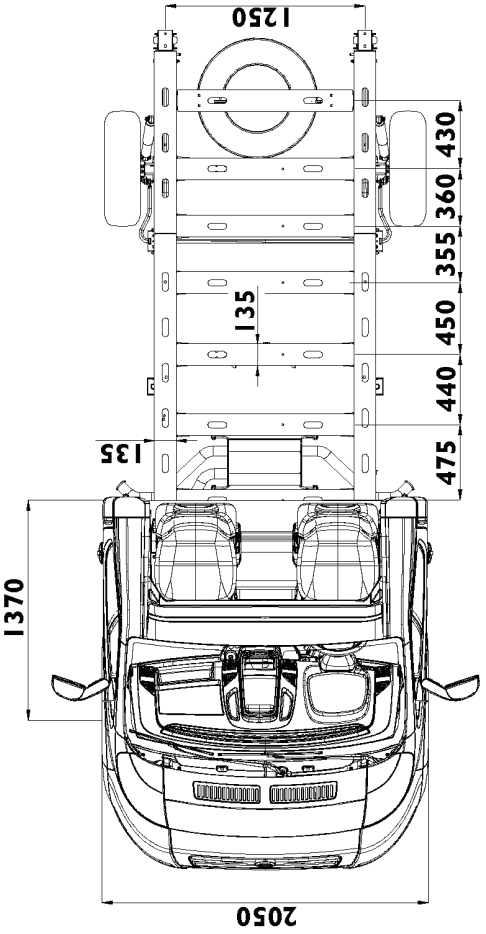


Medium wheelbase special chassis cab

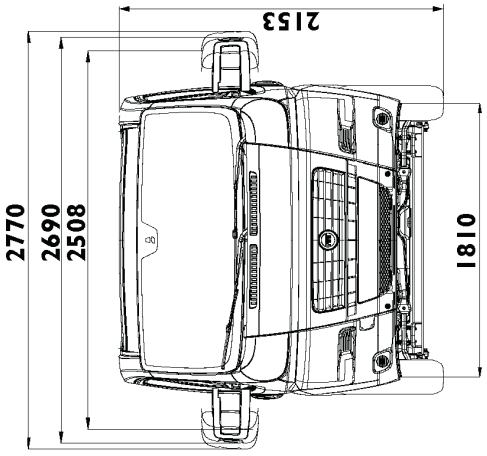


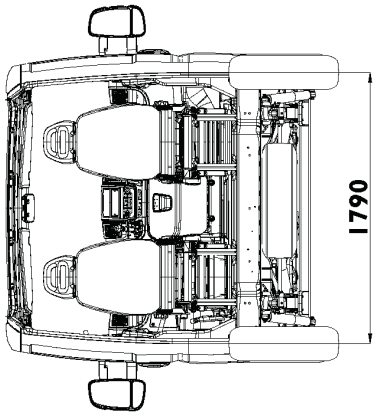


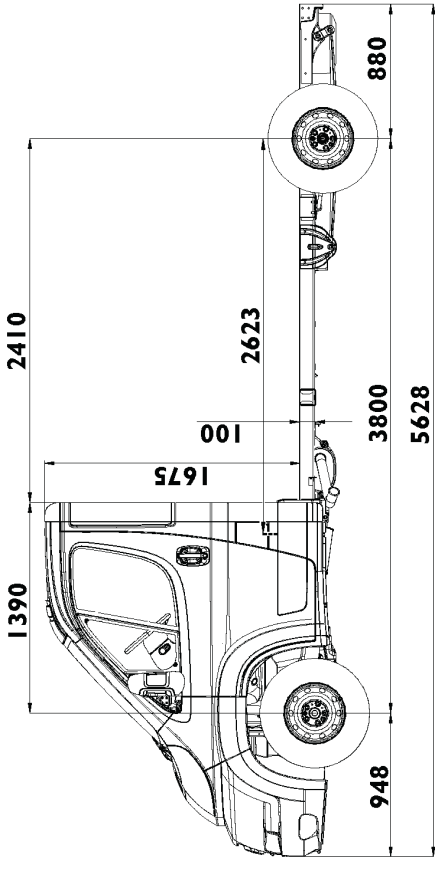


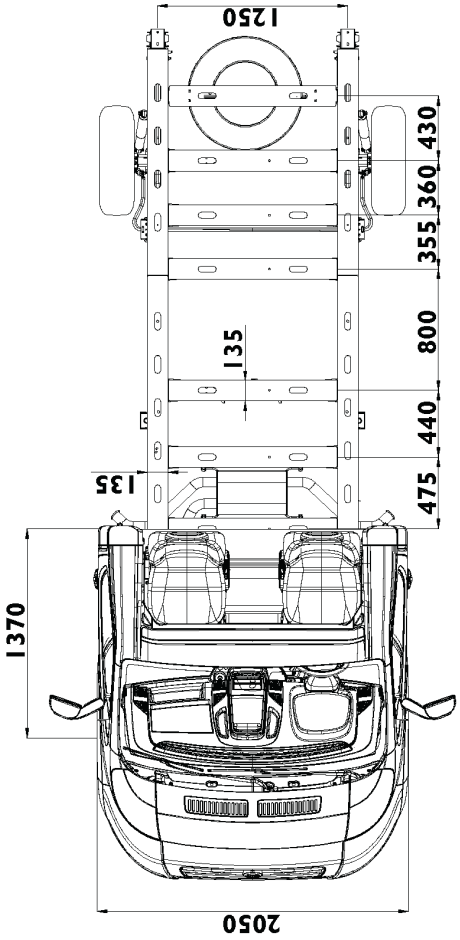


Medium-long wheelbase special chassis cab

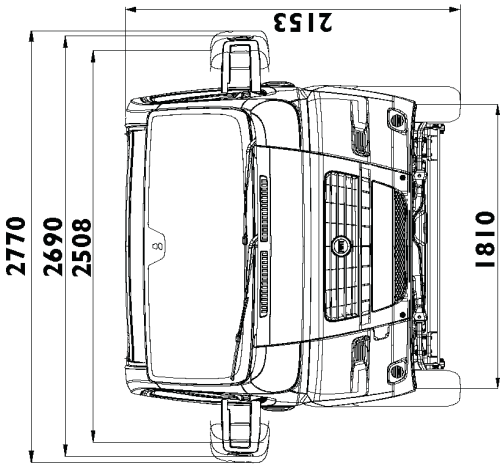


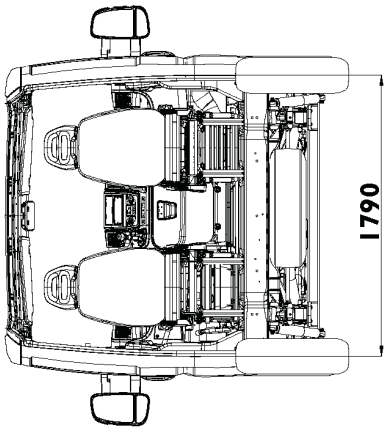


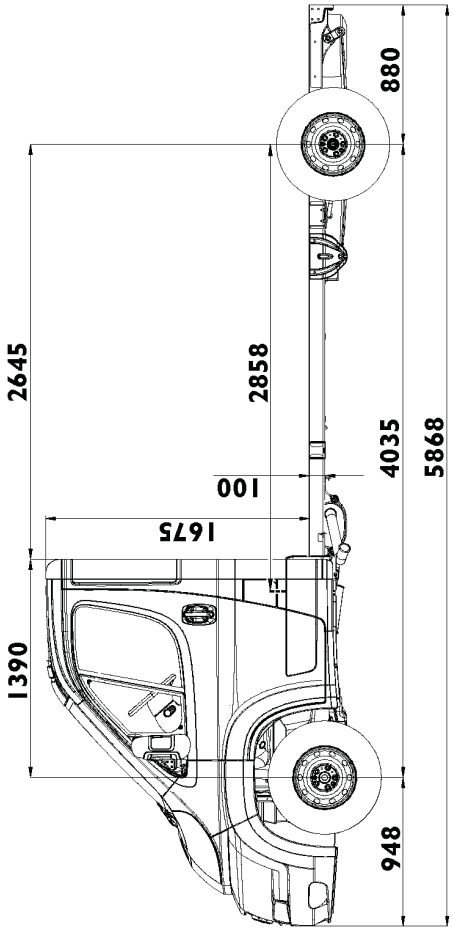


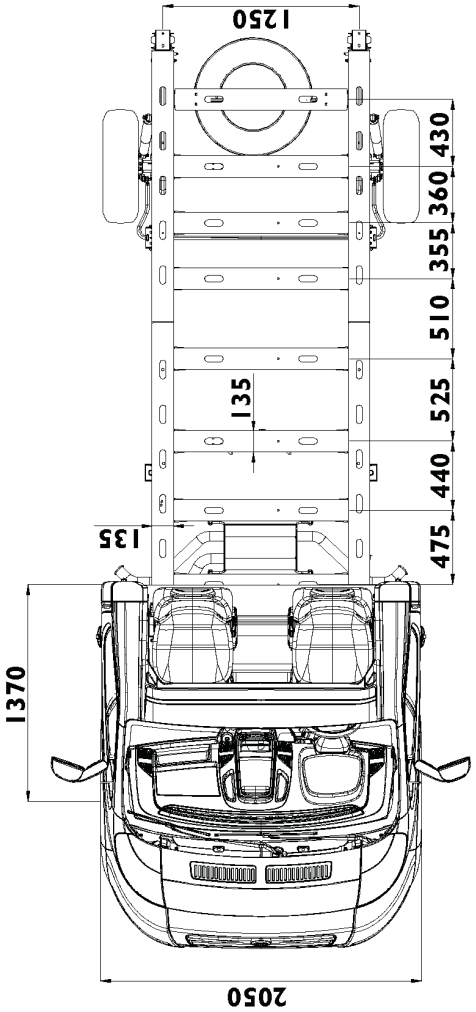


Long wheelbase special chassis cab

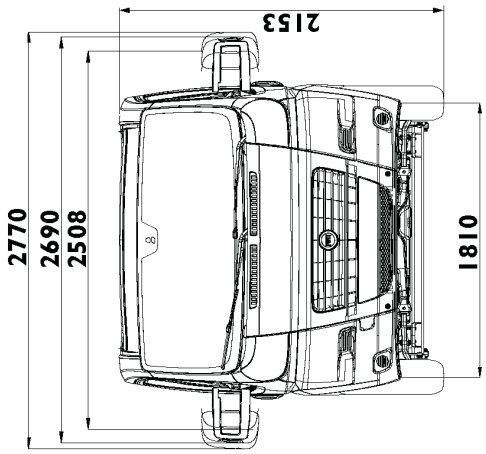


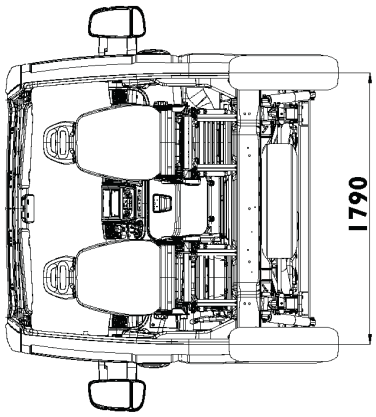


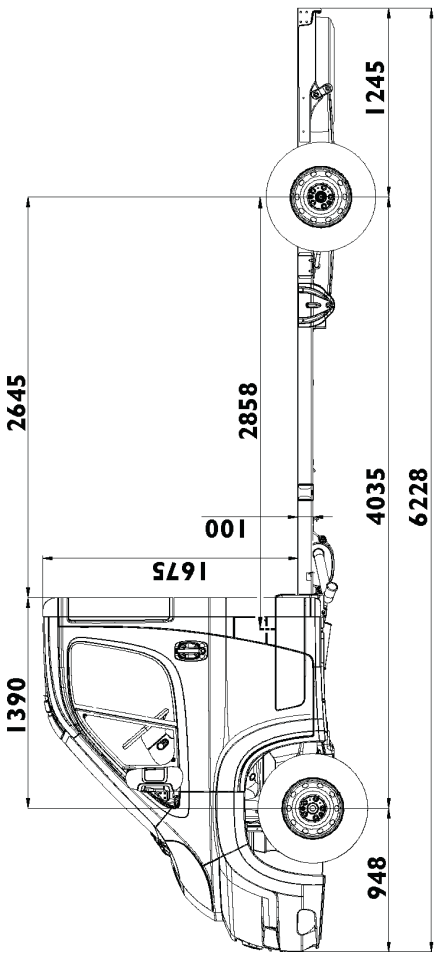


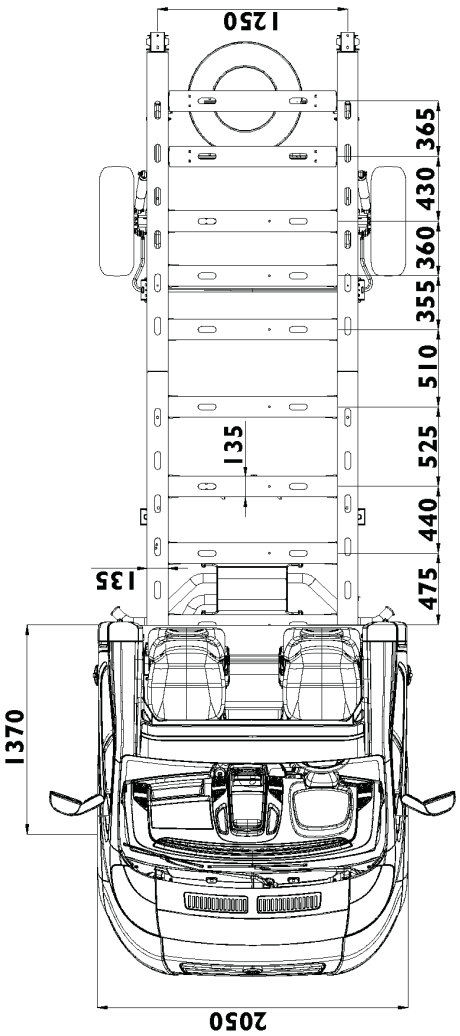


Extra-long overhang special chassis cab

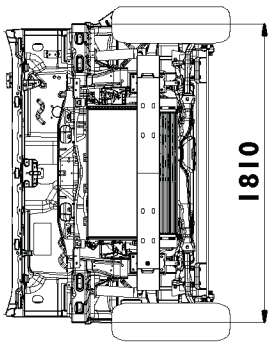


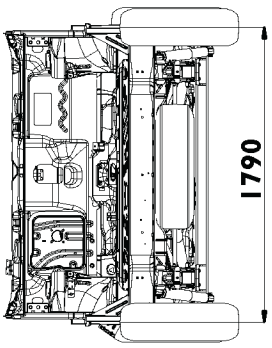


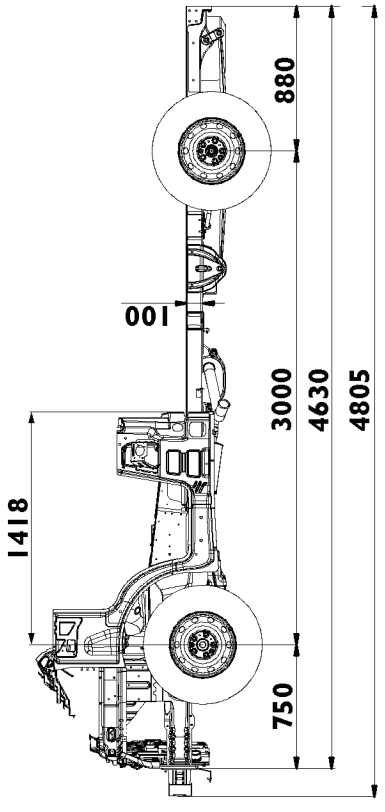


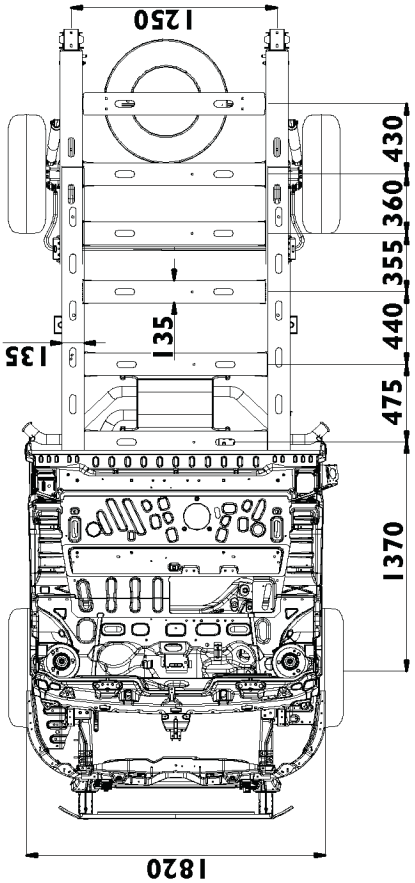


Short wheelbase special basic chassis

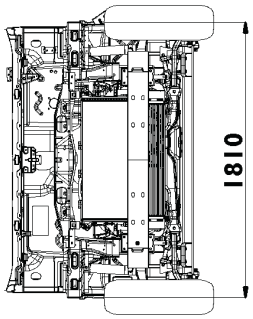


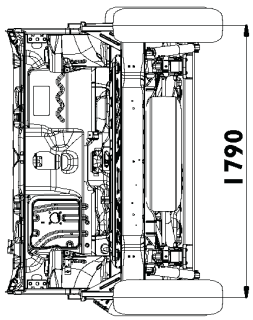


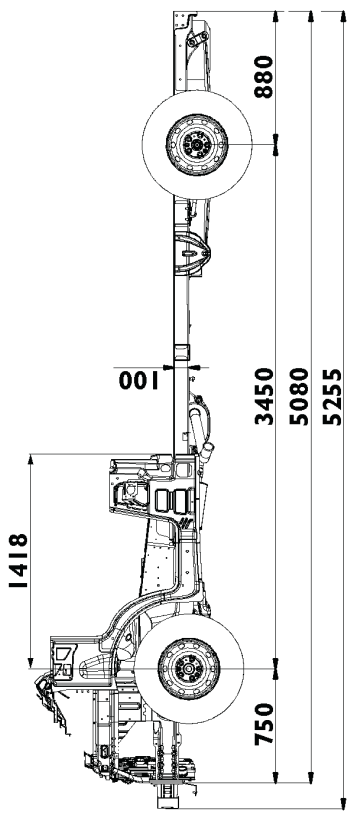


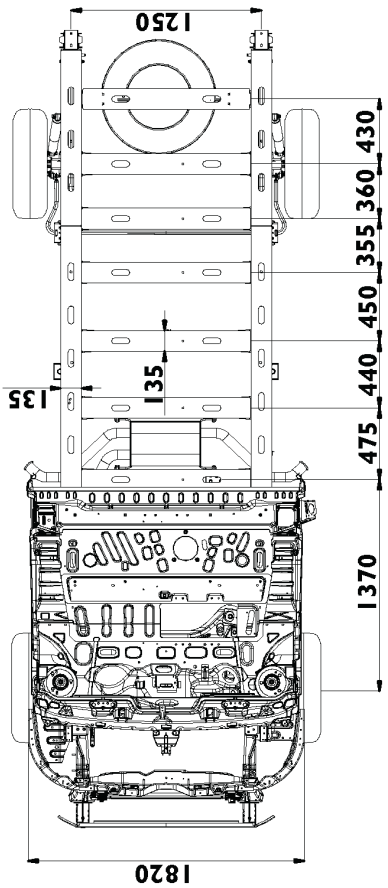


Medium wheelbase special basic chassis

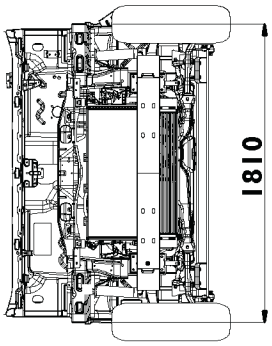


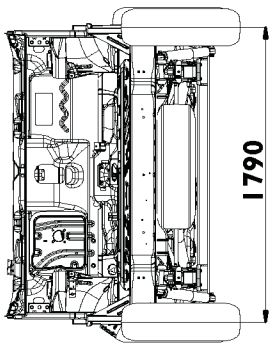


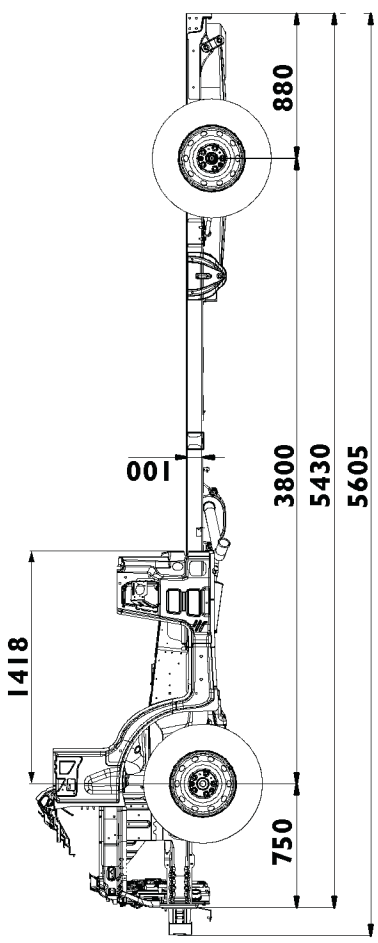


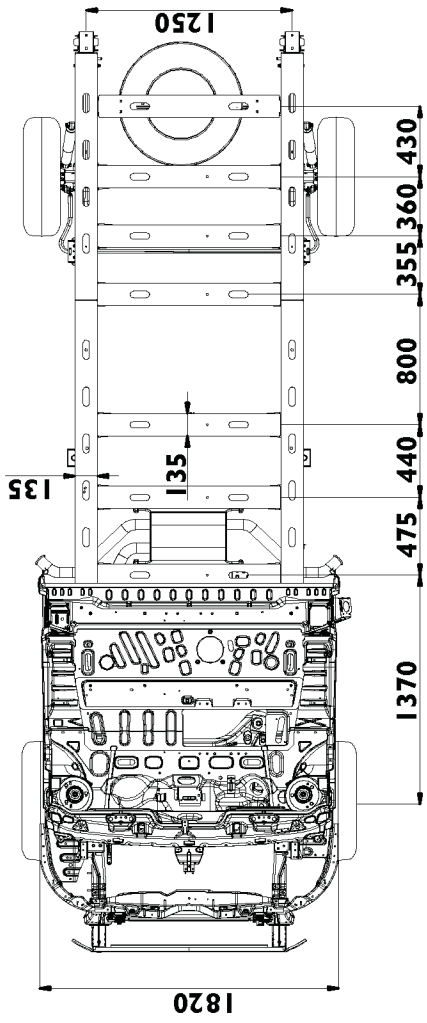


Medium-long wheelbase special basic chassis

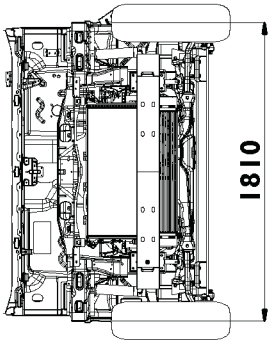


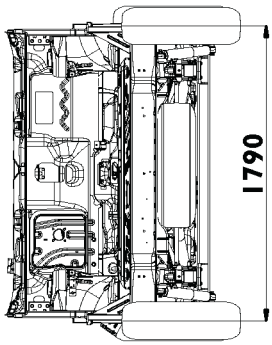


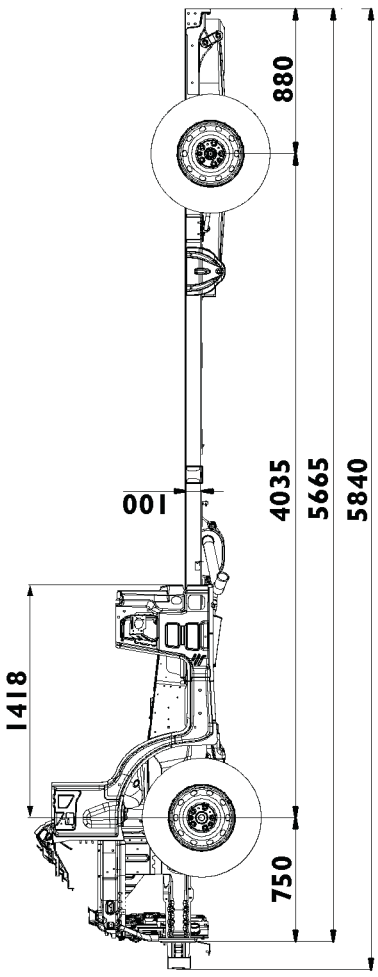


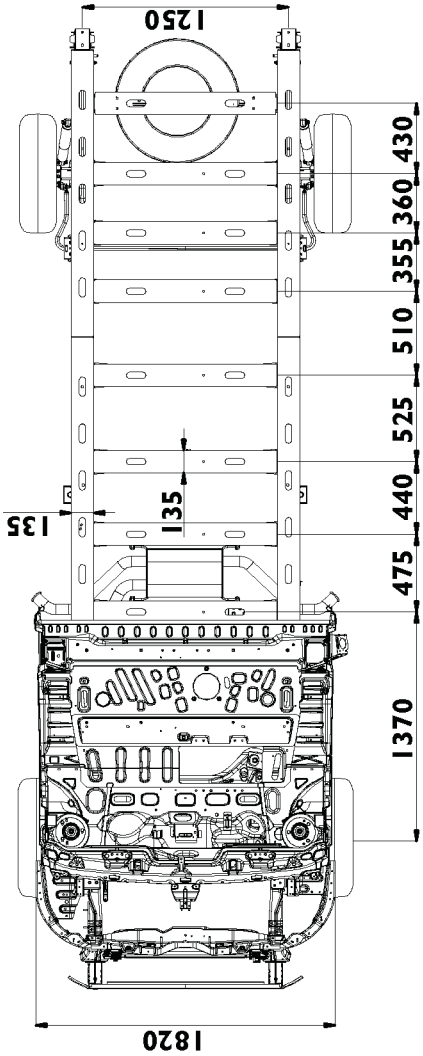


Long wheelbase special basic chassis









Extra-long overhang special basic chassis