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english version

Guide for the Fitting of Bodywork for the RENAULT MASCOTT

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édition anglaise

IMPORTANT
How to read the "Guide for the Fitting of Bodywork for the RENAULT MASCOTT"

The present document consists of three sections:

A - "General features": This describes the relevant general principles and basic rules applicable for the conversion and fitting of equipment to vehicles in most cases for the majority of applications.

B - "RENAULT MASCOTT special bodybuilding features": This deals in greater detail with presentation of the vehicle, attachment of the body and electrical pre-arrangements.

C - "Supplementary information on the RENAULT MASCOTT vehicle": This deals in greater detail with power take-offs, air-operated and specific equipment, assembly of equipment to chassis and cab.

If a topic is dealt with in the three sections, the relative information may be:

- ***complementary:** in this case the "Special bodybuilding features" section provides details or values relating to the topic dealt with in "General features".*
- ***partially or fully contradictory:** when the RENAULT MASCOTT vehicle is endowed with a special feature whose characteristics go against general principles. In such case, the elements regarding this specificity in the "Special bodybuilding features" section supersede those dealing with the same topic in the "General features" section.*

You may need, when looking for information on a specific point, to consult the three "General features", "Special bodybuilding Features" and "Supplementary information on the RENAULT MASCOTT vehicle" sections, so as to ensure that you have obtained all the relevant details.

The information given by the Manufacturer in this document is compiled in relation to the technical specifications in force on the date of drafting of the document.
It is subject to modification in the event of changes made by the OEM during the manufacture of the different units and accessories for vehicles of its make.

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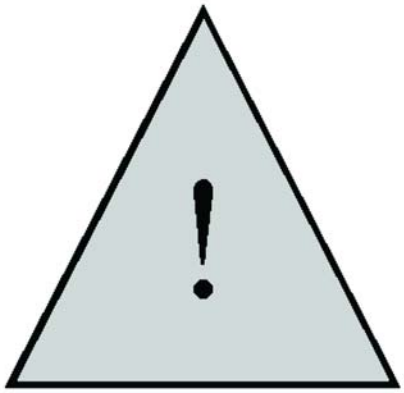
Carrossiers & Equipementiers
ATTENTION
véhicule électronisé EURO3
Respecter IMPERATIVEMENT
les consignes de carrossage
ou
Contacter le constructeur



Karosseriebauer & Ausstatter
ACHTUNG
Fahrzeug mit Elektronik EURO 3
UNBEDINGT die Hinweise
für die Aufbauten beachten oder
sich an den Hersteller wenden.

Carroceros y proveedores de equipos
ATENCION
Vehículo electronizado EURO 3
Respetar OBLIGATORIAMENTE
las instrucciones de carrozado
o
contactar con RENAULT V.I

Bodybuilders & Equipment Manufacturers
WARNING
EURO 3 electronically managed vehicle
It is ESSENTIAL to comply with
bodybuilding instructions
or
Contact the vehicle manufacturer

Carrozzieri e Allestitori
ATTENZIONE
Veicolo con elettronica EURO 3
Rispettare TASSATIVAMENTE
le istruzioni per la carrozzatura
o
Contattare il costruttore

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CHAPTER -A-
GENERAL FEATURES

IMPORTANT

General principles and basic rules applicable for the conversion and fitting of equipment to vehicles in most cases for the majority of applications are detailed in this "General features" chapter

1. GENERAL FEATURES

1.1 Scope of liability

RENAULT TRUCKS vehicles are merchandized at the end of corroborated technical designwork and endurance testing, taking the various laws, regulations, standards... involved into consideration.

Modifications to a RENAULT vehicle for the fitting of bodywork and equipment should be carried out in accordance with the rules and recommendations set out in this bodywork fitting guide and require an “Agreement in Principle”, issued by the RENAULT TRUCKS Product Applications Department.

Guarantee and responsibility

Any intervening party is responsible for his services in terms of guarantee and responsibility, including any damage caused by his work and/or the equipment installed on-vehicle or the basic product.

In the event of RENAULT TRUCKS (or its network) being prime contractor for its own equipment (in relation to the end customer), the guarantee is considered as being at least that of the warranty offered by RENAULT TRUCKS to its customer.

Unless clearly specified otherwise in the order, the equipment warranty shall be negotiated directly between the end customer and the equipment manufacturer.

The meeting of recommendations contained in the present document can in no way be considered as relieving the equipment manufacturer’s responsibility, but simply as complying with the basic rules for professional trade practice.

Any breach of these recommendations must be considered as shortcoming in respect of the rules and shall relieve RENAULT TRUCKS of its liability in the event of damage connected directly or indirectly to such non-compliance.

All the equipment is considered to comply with these recommendations and shall not require any acceptance testing upon delivery to check the conformity.

RENAULT TRUCKS guarantees non-modified original parts and components.

Interventions, conversions, adaptations of fittings carried out by the intervening party involves his responsibility, even if they are authorized administratively (Conversion appendix II).

Such conversions must not under any circumstance lead to any impairment of the quality or of the primary functions of the component elements of the vehicle (whether these elements are affected directly or not by the intervention).

Any modification, changing of position of constituent vehicle parts or elements must be covered by an “Agreement in Principle”, issued by the RENAULT TRUCKS Product Applications Department.

For further information or assembly agreement, contact:

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Fax (Marketing) (+44) (0)1582 479 146

1.2 Regulations

The bodybuilder must meet:

- the different European and/or destination country laws, regulations and standards governing driving and vehicle building,
- the stipulations of the Highway Code and its various amendments and appendices,
- the different laws, regulations and standards governing road traffic in force in the country of destination.

The scope of this compliance must cover, among other things:

- Lighting and signalling,
- Weights and dimensions,
- Fields of vision and rear view,
- Regulation protection devices (e.g. side guards, anti-spray, run-under guard),
- Hitch coupling and towing systems, (compliance with standards and regulations),
- Specific clauses concerning the transport of dangerous goods (ADR),
- Closures,
- Pollution control standards,
- Electromagnetic compatibility standards for electronic equipment.

1.3 Safety

All components having an influence on:

- Control of the driver of the trajectory and the ability to stop the vehicle and its trailer,
- Load distribution on the front / rear, the left / right,
- Risks of fire,
- and any other risk for the vehicle and its surrounding environment.

Among the components, we would mention, among others:

- Cab tilt mechanism,
- Roadwheels (tightening of the nuts),
- Seats and seat belts (anchorage points),
- Attachment of bodywork or equipment to be in conformity with the technical instruction document in force, (i.e. the Guide for the Fitting of Bodywork),
- Hitch coupling and towing systems, (i.e. anchorages),
- Electrical systems (protection of circuitry, the electrical rating, attachment, conformity of the connections with the technical instruction document, (i.e. the Guide for the Fitting of Bodywork),
- Warning systems and driver information systems, (i.e. no interference with the information given by the instrument panel),
- Information for use affixed by the manufacturer to the vehicle (i.e. decals for tilting of the cab, drilling points, welding points, batteries, etc...),
- Extension and reduction of the length of the wheelbase and the rear overhang,
- Re-location or replacement of the cross-members,
- Circuits for ancillary equipment.

In order to guarantee the safety and the satisfactory operation of the vehicle, modification of the following components is strictly forbidden:

- Brakes: circuits, controls and anchorages,
- Steering: circuits, controls, anchorages and geometry,
- Axle and drive axle housing assemblies,
- Air-bag system and seat belts pretensioning systems,
- Electronics.

1.4 Quality assurance

Our permanent objective is to give satisfaction to our customers and we must achieve this in full on the end product consisting of a chassis, bodywork and/or an item of equipment.

In order to achieve this objective, RENAULT TRUCKS expects from all those co-operating with it in the field of mounting bodywork and equipment supply to implement a Quality Assurance System.

RENAULT TRUCKS can demand proof for the execution of all bodywork, the fitting of equipment or modification of a basic truck, in accordance with Standard ISO 9000, of:

- Conformity with all legislation, EC Directives and national regulations,
- Compliance with the manufacturers' directions,
- Control of quality of the execution of the work.

This is done with the knowledge that, on the face of it, the vehicle is considered as complying with the whole of the regulations.

1.5 Documentation

In all cases involving equipment, the installer is obliged to supply a manual covering the use, service, maintenance and safety of his installation.

1.6 General instructions

When building and fitting a body (including such equipment as rear run-under guards), a certain number of vital requirements specific to each type of vehicle must be taken into consideration. These various points relate to maintenance, accessibility and the circulation of fluids.

Examples:

- Ease of access to the various maintenance and lubrication points, to the fuel tank and fuel gauge, to the batteries and the various electrical terminal boxes.
- The ability to easily dismantle the various component parts of the transmission and the suspension.
- Access to the circuits for air intake, exhaust, and fuel supply.
- Taking into account the wheel movement detailed on the bodywork drawing (caution: take care to provided for extra clearance for snow chains).
- Ventilation of the brake drums and discs and the battery compartment.
- Radiator inlet and outlet areas, which must not be modified.
- Full compliance with the dimensions and weights specified in our technical documents. Under all circumstances, the bodybuilder must ensure free movement and safe operation of all the moving component parts of the chassis (i.e. springs, prop shaft, etc...)
- The addition of a body must not affect the vehicle running and driving safety. Take care to ensure that a balanced distribution of the loads on the right and the left hand sides of the vehicle is obtained.
- For any bodywork installation, a calculation of load distribution must be made for each axle, in order to check that the weight imbalance between the right and the left hand side is below 4%.
- The flow of the coolant must be maintained at all times. It is, therefore, not allowed to blank off, even partially, the air intakes provided (on the radiator grille or the front end). Orange ADR or similar “Hazardous Substances” plates should be affixed to solid surfaces (i.e. without vent holes).

Upon arrival of a vehicle in your workshop for body fitting, we recommend that you should check one hour after the arrival of the vehicle, the state of charge of the batteries.

Voltage at the battery terminals	**Specific gravity of the electrolyte**	**State of charge**
12 Volt battery		
12.7 Volts	1,27	100 %
12.5 Volts	1,24	80 %

During the period for the fitting of the bodywork, you should particularly check that:

- The vehicle is not run without a battery.
- Do not move the vehicle on the starter motor.
- Do not use a booster starter.
- Ensure that the tyre pressure is checked and tyres inflated to the correct value where necessary.
- Protect body components or items of trim against all damage.
- Refit the original batteries, where these have been taken off.

IMPORTANT

- Whatever work you are doing on the vehicle, you must switch off the electrical circuit at the master switch or by disconnecting the batteries in order to avoid any risk of electric shock during work.
- When a vehicle is laid up (i.e. at a standstill for longer than 10 days), disconnect the electrical circuit by removing the fuse or by tripping the circuit-breaker so as to avoid discharge of the batteries through the tachograph.

The information contained in this manual is only applicable to bodywork in steel. For aluminium bodies, refer to the Product Applications Department of RENAULT TRUCKS

It is forbidden to weld, grind, cut up, drill or heat the sidemembers or cross-members unless the contrary is clearly stated. These operations may only be carried out in conformity with the recommendations laid down in the present document.

Any special case, any bodywork fasteners and fittings not described in this manual must be submitted for our approval prior to use.

Before commencing the fitting of any bodywork, you must consult:

- The Vehicle Technical Data Sheet,
- The bodybuilders drawing and the relevant calculation sheets which relate to the body to be fitted,
- The vehicle driving and maintenance handbook.

If you do not have these items available, you should obtain them from RENAULT TRUCKS Dealers or the Product Applications Department.

In the technical manual and on the bodywork drawing is stated the permitted maximum and minimum length of body; we would strongly advise you to stay within these limits.

Furthermore, it should be noted that the changing of position of a component such as spare wheel, tank, etc..., the modification of a chassis without uniform weight distribution or the fitting of an over-cab extension, causes a modification of the load distribution of a fully equipped chassis in every single case.

Modification to load distribution must be compensated for by an alteration in the permitted length for bodywork. It then becomes necessary to calculate the new position of the centre of gravity of the bodywork.

The weights specified in our technical data sheets refer to standard vehicles, ready for the road, without optional extras.

Furthermore, the weight of chassis cab is given with a tolerance of plus or minus 4%.

Optional equipment such as reinforced springs, power take-offs, different tyre fitments, will cause an increase in weight for the basic chassis.

For these reasons, when weighing the chassis cab, bodybuilders should weigh:

- the front axle(s),
- the rear axle(s),
- the complete vehicle,

without driver, without passenger, but with full fuel tanks and with vehicle on-board tool kit.

For the preparation and attachment of the various types of bodywork, it is preferable not to take off the wheels, unless absolutely necessary.

Nevertheless, you must take the precautions set out below:

- It is forbidden to paint the bearing surfaces of the wheel rim hubs and the seatings for wheel nuts.
- During fitting, make certain that the parts are perfectly clean prior to fitting.
- Tighten the wheel nuts to the torque recommended (cf. vehicle driving and maintenance handbook)

Installation fitted with key-operated locks: the section of such keys must be very different to that used for the vehicle keys. Indeed, these keys should not be able to be put into the vehicle locks by mistake, thus avoiding any risk of damage to the barrels of the locks.

1.7 Chassis markings

The identification number of the vehicle is on the sidemember (refer to the vehicle driving handbook).

The identity markings of the vehicle must remain visible and accessible without having to remove any part of the body.

1.8 Adjustments to the vehicle settings

Under no circumstance may bodybuilder or converters make any alteration to the original settings of RENAULT TRUCKS vehicles.

1.9 Cleaning

1.9.1 Bodywork

So as not to cause any damage to the condition of the paintwork and the seals:

- Avoid using a high temperature jet of steam.
- Restrict the use of brushes. They must be in good condition and well maintained.
- We advise against the use of brushes, during the first month of vehicle use.
- If you are using a high pressure jet wash unit, limit the pressure to 80 bars maximum.
- Keep the lance well away from the bodywork; do not spray fluidtight joints.
- Use neutral soap based products.
- In order to remove grease spots, use cleaning fluid (not petrol).
- Parts in aluminium must be cleaned with water to which a non-alkaline washing product has been added, and rinsed with clean water.
- Spread a coat of Vaseline or talcum powder over the seals.

1.9.2 Chassis / Underbody

Use a high pressure unit. Limit the pressure of the jet to 80 bars maximum and the time of use to the strict minimum necessary.

In order to prevent any risk of a problem, do not spray:

- electronic or electrical boxes,
- the seals of link rods,
- hinge pins,
- air inlets for the heater, the engine air intake and air filter,
- pneumatic and electrical apparatus,
- absorbent materials and soundproofing screens,
- fuel gauge.

1.9.3 Cleaning of the cab

Spray lightly or use a cloth dipped in a cleaning agent (i.e. soapy water, methylated spirits, etc...). Products with a petroleum and trichlorethylene base are not to be used.

Spread talcum powder lightly onto the door seals and the windows, as well as any link rods.

1.9.4 Cleaning of the instrument panel

Only use soapy water. Any other product is not allowed.

1.10 Safety and protection of components

Before any operation of grinding, drilling, or welding, ensure that the following are effectively protected or taken off:

- Plastic pipework and tubes,
- Electrical wiring harnesses,
- Suspension springs (particularly for the protection against corrosion),
- Bags for the air suspension (chassis and cab),
- Soundproofing screens,
- Any other component sensitive to heat, to the discharge of incandescent matter, to ultraviolet rays (i.e. electronic control units, electronic components, items in plastic material, flexible anti-vibration mountings, painted items, etc...).

For welding work, comply with the other recommendations described in the chapter entitled “Protection of electrical and mechanical components”.

1.11 Summary of definitions

Maximum body length (Dimension W on technical data sheets and bodywork drawings).

This is the bracket of lengths for bodies (not including fittings and accessories) worked out in relation to the extreme positions of a given centre of gravity for a load which is taken to be evenly distributed and taking into account the space which must be left to the rear of the cab, laid down by the manufacturer, and the maximum permitted loads per axle on a chassis cab without options.

Body start (Dimension B on technical data sheets)

Minimum distance between the front axle centre-line and the front end plane of the body.

Load distribution calculations

Comply with the regulatory constraints for each country and the load limits given per axle for each model by RENAULT TRUCKS

We remind you that these values are given for uniformly distributed loads.

Chassis rear overhang (Dimension N on technical data sheets)

Horizontal distance between the centre-line of the rear roadwheels and the rear extremity of the body.

Body rear overhang (Dimension X on technical data sheets)

Horizontal distance between the centre-line of the rear roadwheels and the rear extremity of the body (excluding fittings and accessories).

Wheelbase (Dimension F or F' on technical data sheets).
Distance between the centre-lines of the front and rear roadwheels (vehicle laden).

Maximum axle weight

Carrying weights are stipulated on each axle for each type of vehicle. These values are indicated on the technical data sheets and on the VIN plate and must be complied with on all vehicles fitted with bodies when laden and when empty.

Driver and cab passengers weight

For cabs of the semi-forward control type, 2/3 of the weight should be applied to the front axle and 1/3 to the rear axle.

Weight of driver or each passenger: 75 kg (calculated on the basis of the cab seating capacity), unless stipulated otherwise: i.e. Export, Army, Fire Brigade, etc...

For cabs with a seating capacity of more than 3 persons, calculate the weight distribution of the persons on the basis of the seats layout.

For equipment intended for the Army or for Civil Administrations, take the specific stipulations into account.

1.12 Certificate of approval of the conversion of a vehicle

1.12.1 Application for approval

1 - If the body or the equipment fitted do not modify the weight and dimensional characteristics of the chassis entered in the descriptive sheet, the vehicle can be submitted to the Type Approval Department without any action by RENAULT TRUCKS being necessary (within the permitted limits in force).

2 - The maximum rear overhang is equal to 60% of the wheelbase. However, for special cases, we can grant higher percentages - for this, consult us.

3 - If the layout requires modification to the wheelbase, it is essential to consult the RENAULT TRUCKS Product Applications Department. Each case has to be covered by a specific design

4 - The certificate will be issued in accordance to the legislation in force regarding modifications made by and under the responsibility of the bodybuilder, within the limits stipulated by the Manufacturer and relative to:

- the wheelbase
- the distribution of loads
- the cab characteristics.

5 - For more accuracy in your calculations, we recommend you to introduce into the data the weighed weight of the chassis cab to be equipped (capable of varying according to manufacturing tolerances and the various options available). The same applies to equipment for which the manufacturers can accurately define the weight and the position of the centre of gravity.

1.12.2 Body fitting certificate

This defines the installation of the equipment on the chassis cab and the unladen weight imposed on the axles and then the weight when fully laden.

It must be attached to all applications relating to the equipment which do not comply with any of the dimensions set out in the descriptive sheet.

1.12.3 Responsibility for installation

The building and fitting of a body on a vehicle is the sole responsibility of the bodybuilder, who must comply with the recommendations in the present document.

He must ensure that the installation of the body does not affect the functions or the reliability of the components or the road behaviour of the vehicle.

1.13 Painting

1.13.1 Precautions

- Protect the RENAULT TRUCKS equipment (i.e. by using screens, self-adhesive tape, cab cover etc...)
- Never put vehicles into drying ovens at a temperature of **than 80°C.**
- The chassis of the vehicle must be electrically earthed to allow static electricity to run away to earth (protection of electronic boxes).
- The vehicle must be protected against corrosion by paints compatible with those used by our Company and conforming to RENAULT TRUCKS Specification No 4702 441 (protection of bodywork and equipment adapted to RENAULT TRUCKS vehicles) available from the Product Applications Department.
- Thinner solvents must never be used on cables and electrical sheaths.
- Protect the identification marking of electrical wires and compressed air pipes.

Never paint bearing surfaces of brake drums and disc wheels, or with twin tyre fitment, the assembly surfaces between the disc wheels. As a general rule, do not repaint the support surfaces of original fitment nut and bolt hardware and comply with the specification

NOTE

Our Product Applications Department holds the reference numbers for paint colour shades for chassis and cabs at your disposal. These paint colours can be procured as “spare parts” and can be ordered from our dealers.

The cab colour shade is indicated on the front end of the cab.

Since 1994, chassis and accessories are no longer sprayed with the customer’s shade of paint at the time of original fitment.

To preserve the aspect and original quality, it is essential to observe the following methods after fitting equipment, body, sub-frames and various adaptations to major units or chassis frame:

1.13.2 **Major units** (gearboxes, drive axles, engines, axles, etc.)

Works paint: GLYCEROPHTHALIC

Retouch (after fitting PTO, charge indicator, etc...).

Retouch method:

- Clean with a universal cleaning product or with a high-pressure cleaner.
- Wipe down, then apply the primer.
- Let the product cure until mat (about 15 minutes at 20°C), then apply the corresponding undiluted but catalyzed polyurethane lacquer.

1.13.3 Chassis frame and accessories

- Cataphoretic treatment (E-Dip): (sidemembers, cross-members, fittings, etc...)
- Works paint: POLYURETHANE or POLYESTER powder (for other materials).

Retouch method:

Superficial scratches (the metal is not affected).

- Clean with a universal cleaning product
- Wipe down, then apply the corresponding undiluted but catalyzed polyurethane lacquer, using a small brush.

Deep and fine scratches (down to the bare metal).

- Clean with a universal cleaning product.
- Wipe down, then apply the primer, using a small brush.
- Let the product cure (about 15 minutes at 20°C), then apply the corresponding undiluted but catalyzed polyurethane lacquer

Deep and wide scratches (down to the bare metal, drilling of sidemembers).

- Rub down.
- Clean with a universal cleaning product.
- Let the product cure until mat (about 15 minutes at 20°C), then apply the corresponding undiluted but catalyzed polyurethane lacquer

Making good after conversion (after converting wheelbase and overhang).

- Grind, rub down; prepare the area in question (burnt paint, welding scale, etc...).
- Clean with a universal cleaning product or using a high-pressure cleaner.
- Mask with tape (electrical wiring harnesses, air and fuel pipes, labels, etc...)
- Wipe down, then apply the primer.
- Let the product cure until mat (about 15 minutes at 20°C), then apply the corresponding undiluted but catalyzed polyurethane lacquer.
-After drying, put back the electrical wiring harnesses, air and fuel pipes and accessories.

Spraying chassis and accessories (with customers colour shade).

The bodybuilder undertakes to preserve the aspect and quality of the original fitment vehicle (except for nut and bolt hardware).

- Clean with a universal cleaning product or using a high-pressure cleaner.
- Mask with tape (electrical wiring harnesses, air and fuel pipes, labels, etc...)
- Wipe down, then apply the primer.
- Let the product cure until mat (about 15 minutes at 20°C), then apply the corresponding undiluted but catalyzed polyurethane lacquer.
- After drying, put back the electrical wiring harnesses, air and fuel pipes and accessories.

NOTE

All spray gun operations are to be carried out in a painting booth.

1.13.4 Recommended products

Manual cleaning

Universal cleaning product or equivalent solvent

Products approved by RENAULT TRUCKS.

Supplier	Commercial name	RENAULT TRUCKS Ref.	Supplier Ref.
BASF	PK 900	50 01 821 758	SV 20023F
ICI AUTOCOLOUR	Slow Spirit Wipe	50 01 854 983	P850–1402
STANDOX	ENTFERNER Agent	50 01 825 985	FA 931 2002

High-pressure cleaning

Degreaser, phosphater degreaser

Filing and sealing

Products approved by RENAULT TRUCKS.

Supplier	Commercial name	RENAULT TRUCKS Ref.	Supplier Ref.
STANDOX	“EPOXY” filler-sealer “EPOXY” hardener “EPOXY” thinner “EPOXY” slow thinner thinner 2KS	50 01 826 019 50 01 825 990 50 01 826 005 50 01 829 256 50 01 825 992	FA 931 5203 FA 931 5204 FA 931 5205 FA 931 5213 FA 020 7810
ICI AUTOCOLOUR	“EPOXY” filler-sealer “EPOXY” hardener thinner	50 01 829 477 50 01 829 480 50 01 829 481	P580–2100 P210—833 P850–3091

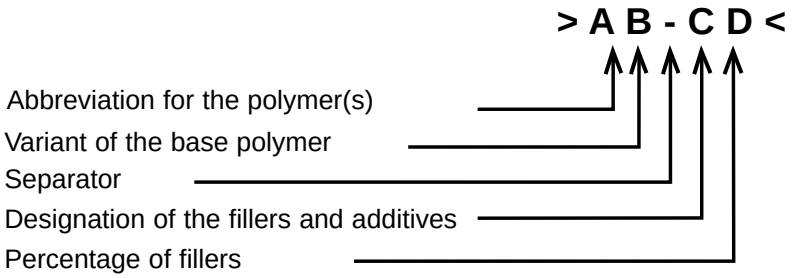
Finish paint

Two-component polyurethane paint and corresponding thinner.

1.13.5 Marking of polymer components (recycling of plastics)

Plastic parts are marked so as to simplify their sorting during recycling at the time when the vehicle is scrapped at the end of its life.

Marking of the plastic parts is done by placing abbreviated terms for the polymer components between the symbols “>“ and “<“. The parts are marked on a face which the customers cannot see and when it is possible the marking is indelible. Marking is done in the following manner:



Marking of single component products

The abbreviated term for the material is enclosed in symbols “>“ and “<“.

For example: “>PP<“ or “PP” indicates polypropylene.

Marking of copolymers

The abbreviated terms for the polymers are separated by a “/”.

For example: “>P/E<” indicates the copolymer propylene ethylene.

Marking of mixtures or blends of polymers

The abbreviated terms are separated by a “+” (heterogeneous structure).

For example: “>PP + EPDM<“ stands for a blend of polypropylene and EPDM.

Marking of polymers with fillers (additives)

The abbreviated term for the polymer is separated from that for the filler by a dash “-”.

The number following the abbreviated term for the filler relates to its percentage in the mixture.

For example: “>PA66 - (GF25 + MD15)<“ indicates polyamide 66 with 25% filler and 15% reinforcement with mineral fillers (in decreasing order of percentage).

Marking of multi-component products

The abbreviated terms for the components are separated by commas, in order of appearance (firstly the surface material).

For example: “>PVC, PUR, ABS<“ indicates skin surface PVC on PUR foam with an ABS insert

Marking of special features

Abbreviated terms for the polymers can be added up to 4 symbols, in order to indicate a modification.

The symbols are put in after the abbreviated terms.

For example: “>PE - C<“ indicates chlorinated polyethylene, “>PE - LLD” stands for linear low density polyethylene.

Table of the principal polymers

Abbreviated term	Variant	Materials
A.B.S		Acrylonitrile/butadiene/styrene
A.S.A		Acrylonitrile/styrene/acrylate
E/P		Ethylene/propylene
E.P.D.M		Copolymer ethylene/propylene/diene
P.A		Polyamide
P.A	6	Polyamide 6
P.A	66	Polyamide 66
P.C		Polycarbonate
P/E		Propylene/ethylene
P.E		Polyethylene
P.E	- HD	High density polyethylene
P.E	- LD	Low density polyethylene
P.E	- LLD	Linear low density polyethylene
P.E	- X	Cross-linked polyethylene
P.M.M.A		Poly(methacrylate of methyl)
P.O.M		Polyoxomethylene
P.P		Polypropylene
P.P.E		Poly(phenylene ether)
P.P.O.X		Poly(propylene oxide)
P.S		Polystyrene
P.S	- HI	Impact polystyrene
P.T.F.E		Poly(tetrafluoroethylene)
P.U.R		Polyurethane
P.V.C		Polyvinyl chloride
P.V.C	- C	Chlorinated polyvinyl chloride
P.V.C	- P	Plasticized polyvinyl chloride

1.14 Electrical equipment

1.14.1 General

- Any mounting of a specific item of equipment on a commercial vehicle must be in conformity with the recommendations of RENAULT TRUCKS and the legislation in force. Its execution remains the entire responsibility of the bodybuilder, both with regard to the suitability for the vehicle being equipped and any possible electromagnetic interference.
- For reference to wiring diagrams, consult the electrical equipment workshop manual for the vehicle (available from the Spare Parts Department of RENAULT TRUCKS).
- Check that the electrical consumption of this equipment is appropriate for the capacity of the batteries and also the charging current rate of the alternator.
  For the fitting of any particular equipment, consult the RENAULT TRUCKS Product Applications Department.
- A schematic diagram should be submitted for the approval of RENAULT TRUCKS, when raising any specific question.
- A wiring diagram for the bodybuilder's or equipment manufacturer's installation must be incorporated into the vehicle driving and maintenance handbook. The electrical connection points for the equipment being supplied should be clearly and precisely indicated on this wiring diagram (even after the agreement of RENAULT TRUCKS has been obtained).
- Follow the electrical protection recommendations of RENAULT TRUCKS; it is forbidden to change the rating of fuses.
- In order to harmonize vehicle equipment, you should use in preference such items as are identical to those fitted in the basic vehicle (i.e. indicator lamps, controls, relays, etc...).
- Assembly of a protective shield on the electric retarder is compulsory for ADR (Transport of Hazardous Substances) vehicles (refer to regulations in force).
- It is compulsory for the supply voltage for the equipment installed to be equal to the rated voltage of the vehicle. The installation of equipment with a 12 Volt power rating on our vehicles (24 Volt rated voltage) is not permitted unless a voltage dropper is added.
- Under the circumstances that additional lamps are fitted, the installation must not damage the fluidtight sealing of the junction boxes.
- Operating without a battery is forbidden.

Consequences on wiring harnesses when modifying the wheelbase or the rear overhang

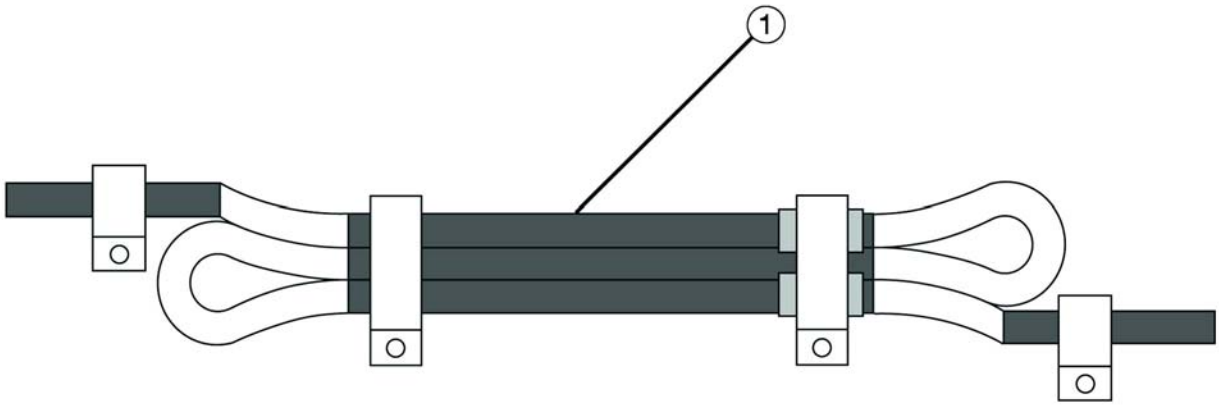
The electrical functions to be supplied at the rear of the vehicle are:
- Left and right rear brake pad wear sensors,
- Left and right "ABS" wheel sensors,
- "Chassis and ABS" wiring earth,
- Diff. lock, reversing buzzer and side/parking lights info pre-arrangement for bodybuilder.

Never cut the over-moulded cables of "ABS" wheel sensors for the purpose of making extensions.

In the event of the wheelbase or the rear overhang being lengthened, order the "ABS" chassis wiring harness for the immediately longer wheelbase.
The RENAULT TRUCKS Product Applications Department is at your disposal for any further information you may require.
If there is a surplus length of wiring harness at wheelbase or rear overhang level, make a coil of the wiring harness (outwards and inwards recommended in relation to the loop) and secure with one or several adhesive ties. The coiling must be attached to the sidemember.
In the event of the wheelbase or the rear overhang being shortened, make one or several coils of the wiring harness (outwards and inwards recommended in relation to the loop) and secure with one or several adhesive ties and attach the coiling to the sidemember.

WARNING
It is absolutely forbidden to make crossovers on a coil.

Coiling example (**1**)

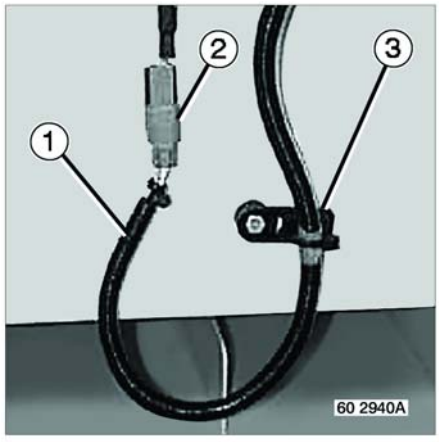


1.14.2 Wiring harnesses

- The section of the cables being used must be suitable for the use in question. Their cross-section should be selected in accordance with the maximum current on-line (5 Amps/mm2).
- The numbering of the wires must be in accordance with the manufacturer's standard.
- The link between the sheath and the connector must be fluidtight.
- Max. filling of sheaths 80% max. It is also necessary for the radius of curvature of split ringed sheaths to be no greater than 2.5 times the outside diameter and it is recommended to direct the split part towards the interior to prevent any opening of the sheath.

Routing

- Use to the full the wiring runs already set up by the manufacturer (i.e. conduits, tubes, sleeves, etc...) and comply with the limit of their capacity.
- Any wiring harness added by the bodybuilder can be routed along with the original wiring runs for the vehicle provided that it does not adversely affect the mechanical mountings for the original harnesses. For vehicles for the transport of hazardous goods, use the protective equipment authorized by the regulations covering the transport of hazardous goods.
- You are requested to avoid contact with other braking system wiring harnesses, hoses and lines routed in the cab.
- You are also requested to avoid any friction between the various parts (metal part, sharp edges, projecting angles).
- Route the harnesses in cold areas (the min hot areas of the vehicle are the engine compartment, especially near the turbocharger, along the left-hand sidemember, the gearbox cross-member and near the exhaust silencer).
- Route the wiring harnesses along the right-hand sidemember, which is opposite the exhaust silencer, or on the cool side of a heat shield. If you are obliged to route wires close to a source of heat (i.e. engine, exhaust system, etc...), the minimum clearance to be complied with is 200 mm.
- Never attach a wiring harness to moving parts (even slight movement).
- The length of the equipment harnesses should be long enough to allow the electrical appliance which is connected to be disengaged (i.e. principal information display, tachograph, etc...).
- It is compulsory to make a loop (1) in front of each connection (2). The operator must be able to disconnect or unplug the harness without having to undo the fastening (3) (cable tie).
- The first fastening must be as close as possible to the connector (less than 200 mm) and on the same anti-vibratory support.



Protection

- All wiring harnesses added by the bodybuilder must be protected.
- Protect the cables either in a flexible sheath (known as thick supple sheath or resin tube) or in a ringed sheath (we recommend the split ringed sheath on account of its easy implementation).
- The electrical cables and sheaths to be used must be designed for automotive use.
- It is necessary to comply with the sheath temperature classes in relation to the different heat zones).

(Split) ringed sheath temperature classes to be used:

Class	Symbol	Average operating temperature	Marking
2	GF2	105 ± 2°C	without or white border
3	GF3	125 ± 3°C	green border
41	GF4I	140 ± 3°C	orange border
5	GF5	175 ± 3°C	purple border

Example:

- In the cab or on the chassis, use the normal sheath GF2 or GF3.
- In the engine compartment or in proximity to hot zones, use the high-temperature sheath GF4 or GF5.

1.14.3 Electrical connections

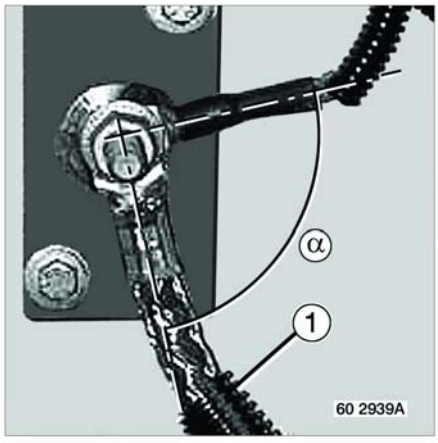
- Any additional connection requires protection that is suitable for the use for which it is intended (even if the power supply provided for the customer by RENAULT TRUCKS is already protected by a fuse).
- Any electrical connection must be properly wired on the power lines supplied by the manufacturer to the bodybuilder's equipment (refer to the servicing and maintenance handbook for the vehicle in question).
- Tapping into the various wiring harnesses supplied by RENAULT TRUCKS is completely forbidden (for example vehicle rear lamps, external marker lamps, contactors, pressure switches, relays, electronic box inputs and outputs, etc...).

  Reminder: a 12 V tapping at the middle point between the two batteries is forbidden.
- The electrical connections of the various wiring harnesses of the bodybuilder must be made using a fluid-tight junction box or otherwise using sealed connectors. If connections have to be made on circuits hooked up to electronic equipment:
  - Ensure that you comply with the polarity recommended.
  - No inductance current must pass through the circuits which have been added.
  - All the earths must be connected up to the available "EARTH" points provided and not to the bodywork of the vehicle.

Example of how to fasten two earths to the same point:

The biggest section earth braid (1) must be fastened in the lower position.

α = 60° minimum



- After work on junction boxes, the seal must always be as integrally effective as the original seal.
- Any power supply requiring a direct connection to the batteries must be capable of being isolated by a battery cut-out (for example: tail lifts) and protected by a fuse sited as near as possible to the batteries. Suitable connection terminals should be used.
- The "+" power supply is taken from the master switch, or failing this, from the battery terminal for vehicles without a master switch, but in no case from the alternator or starter motor terminal.
- Power supplies to comfort-related equipment: i.e. telephone, fax, etc... The quality of the installation is the responsibility of the installer (i.e. reception, static, interference, etc...)
- Preferably, you should use connectors approved and distributed by RENAULT TRUCKS (i.e. type, sealing properties, rating, number of channels, etc...)
- Connectors for equipment should be positioned near the bottom, whilst avoiding areas subject to splashing (i.e. wheelarches, etc...).

1.14.4 Available power supplies

All our vehicles are equipped with the available power supply protected by fuses and these are at the disposal of bodybuilders and equipment manufacturers.

These power supplies are described in the vehicle driving and maintenance handbook (supplied with every vehicle), in the Workshop Repair Electrical Manual, and in this document (all these documents are available from the RENAULT TRUCKS dealer network).

1.14.5 Flasher units

Should the flasher unit become inoperative due to failure to comply with the instructions contained in this document, the coverage granted by the warranty will be lost.

The flasher units are designed for a maximum rating which is marked on the unit.

Do not exceed this power rating.

Connection

In order to make the connections correctly, consult either the identification marks which are located close to the terminals, or the wiring diagram on the label which is affixed to the flasher unit cover.

1.14.6 Recapitulation tables of standard power sockets

SUPPLY VOLTAGE	DESCRIPTION AND STANDARDS	SOCKET DIAGRAM (front view)
12 Volts	12 N type socket (Standard: - BNA.R.43.407 dated April 1982 - ISO 1724). 1 - LH direction indicator lamp. 2 - Rear fog lamp. 3 - Earth. 4 - RH direction indicator lamp. 5 - RH rear side and marker lamp and number plate illumination lamp. 6 - Stop lamp. 7 - LH rear side and marker lamp and number plate illumination lamp.	 600037
12 Volts	12 S type socket (Standard: - BNA.R.43.410 dated August 1984 - ISO 3732). This is a supplementary socket which is assembled in addition to the 12 N socket. 1 - Reversing lamp. 2 - Not allocated. 3 - Earth. 4 - Supplementary + power supply. 5 - Earthing monitor. 6 - Positive (+) power supply. 7 - Not allocated.	 600038

1.14.7 Additional direction indicator lamps

- On tractors and rigids

Should the lamps provided not meet all the requirements of the legislation in force, the bodybuilder may add extra lamps supplied with power by the same circuit as the front lamp or by a special circuit should one be available from the flasher unit. In all cases, comply with the power rating.

We strongly advise you to refrain from fitting any other lamp not required by the regulations.

- On trailers and semi-trailers

The standards in force concerning trailers require only two circuits for the flasher units: one circuit for the right-hand side and the other for the left-hand side. No additional lamps must be fitted on the trailer or semi-trailer which run from the monitored trailer lamps.

The addition of extra lamps entails the fitting of new wire runs which have to be drawn from the non-monitored lamp terminals in the flasher unit.

Overloading

Under no circumstances must extra lamps be fitted that exceed the power rating on the flasher unit. The main consequences of such overloading are as follows:

- The service life of the flasher unit is shortened, even when it would appear to be operating normally in spite of the overload.
- Operation is adversely affected by intermittent or permanent sticking of the contacts (the lamps remain lit without flashing)
- The appliance may be **off-circuit for the duration of the overload.**

Protection of the flasher unit (depending on your vehicle's equipment)

In the event of excess current, the flasher unit will cease to operate. To return it to service:

- Move the flashing lights control switch to the 0 “off” position.
- Find the cause of the overcurrent (lines or lamps) and remedy it.

You will then be able to use the flashing lights again normally.

1.15 Brakes

1.15.1 Regulations

It is forbidden to modify officially approved braking circuits which conform with the standards set out by the Highway Code.

Any modification, without prior agreement from RENAULT TRUCKS, is done under the sole responsibility of the author of such a modification.

1.15.2 Modification to brake lines

The welding or addition of unions to brake lines is forbidden. In the event of modification to the line, replace the original pipe by a pipe built in one single piece and presenting the same characteristics (inside diameter, steel grade, union type, fastening point).

Execution of the conversion remains the sole responsibility of the equipment manufacturer.

2. GENERAL RULES TO BE OBSERVED WHEN FITTING BODYWORK

Before carrying out any work, protect the cab with a cover.

Our vehicles are equipped with plates, pedestals or brackets. Preparation work may involve extra drilling or welding.

The principles described below must be adhered to.

2.1 General principles of welding

2.1.1 Precautions

Protection of batteries

A battery at the end of its charge produces a mixture of oxygen and hydrogen gas. The ignition of this gas presents dangers of battery explosion in the case of the presence of a source of heat nearby. As a result, during a welding operation near the batteries (i.e. engine compartment, front end of the vehicle), take out the batteries and store them in a well-aired location away from the place where welding is being done. This recommendation applies equally for grinding operations.

Soundproofing screens

In the case of welding or use of a sanding disk, either provide effective protection or remove the soundproofing screens, if necessary.

Protection of electrical and mechanical components

The vehicle is equipped with numerous electronic circuits: alternator, regulator, flasher units, speed limiter, ABS, etc...

Before any operation involving electric arc welding, make an earth connection by disconnecting the two negative (-) and positive (+) cables from the battery (starting with the earth cable) and connecting them to the frame earth. If the vehicle is equipped with a master switch, this should kept engaged (circuit closed). Place the earthing clamp as near as possible to the point of welding, but never on rotating parts (prop shaft, fan hub, etc...) or on a subassembly having moving parts (i.e. air compressor, turbocharger, etc...)

Nearby plastic pipes and electrical cables, springs and air-suspension bags are to be protected or removed. This also applies when grinding or drilling.

When reconnecting the battery, observe the polarities, commencing with the positive (+) terminal. Reversal of polarity may cause irreparable damage to electronic components.

2.1.2 Preparation of parts for welding

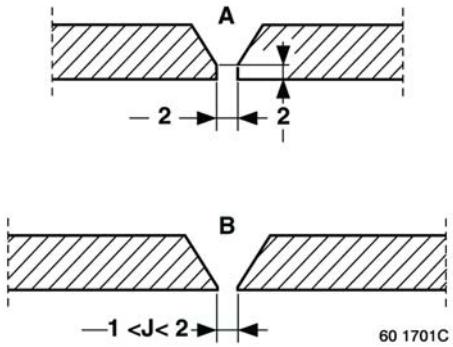
Clean the parts, primarily at the location of the weld and at the connection of the earthing wire. This allows:

- free and regular electrical current flow (regularity of weld bead),
- avoidance of inclusion of impurities in the molten metal (weld quality),
- avoidance of spatter and emission of smoke (safety for the welder).

For conversions (extensions, reductions and reinforcement gussets), we recommend arc welding with electrode type B. When semi-automatic welding is used, the bodybuilder must be able to guarantee internal weld quality.

Preparation of specific edges on chassis frames

A - With electric arc welding
B - With welding under gas shield (MAG or MIG)
J - 1 min., 2 max.



Method of welding to be specifically used on chassis frames

– Prepare the edges at 45°

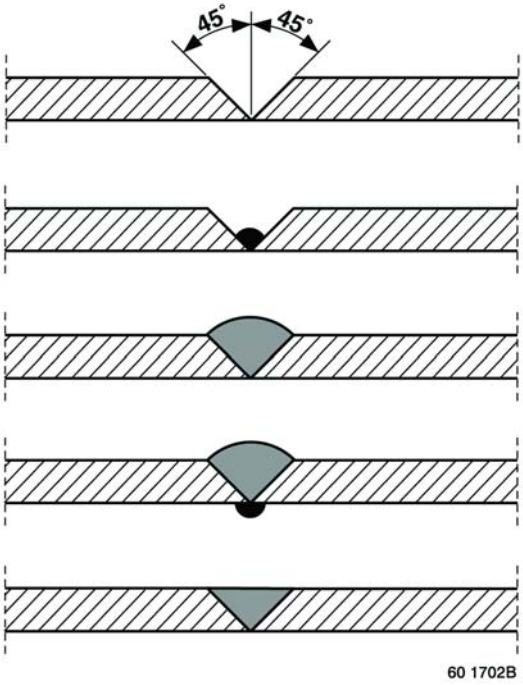
– Tack

– Position slave butts

– Weld on one single side

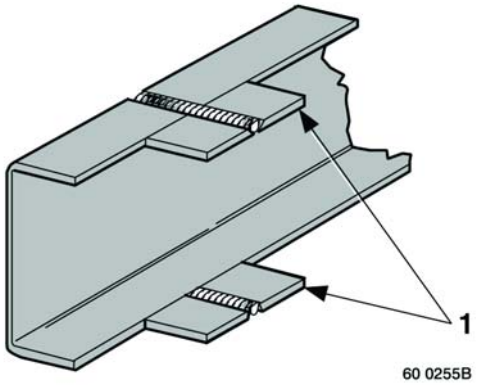
– Weld on second side

– Grind welds flush on both sides



Slave butts

The object of slave butts is to avoid the starting of cracks at the outside edges of the weld joint. Before final welding align butts with plates of the same thickness as the plates to be joined, holding them in position using quick action clamping devices.
They must not under any circumstances be held in position by weld tacks on the plates to be joined.



2.1.3 Welding processes

Static or rotary arc welding set

- dc welding set recommended
- coated welding rods

Welding rod usage table

Electrode diameter (in mm)	2.5	3.15 (*)	4 (*)	5
Average current (in amperes)	75 to 90	95 to 110	120 to 140	150 to 175

(*) Most frequently used diameters

EN 499 E 382 B 32 H for class C

If steels are mixed, take the best performing steel electrode category.
Standard **NF EN 499** replaces standard NF A 81-309.

Relevant standards

ISO (2560)	NF (EN 499)	NF (A 81 309)	AWS (A 5.1)	DIN (1913)	BS (639)
E 43 5 B 110 20 (H)	E 382 B 32 H 5	E 43 5/4 B 110 20 (BH)	E 7018	E 43 54 B 10	E 43 54 B 110 20 (H)

Commercial designations

Marke	E 382 B 32 H 5
SAF	MF 48

MIG or MAG semi-automatic welding set

MIG: - Metal Inert Gas
- for welding with electrode wire under inert gas shield (Argon, Helium...)
- used for welding stainless steels and non-ferrous metals.

MAG: - Metal Active Gas
- for welding with electrode wire under active gas shield (CO_2, Argon + CO_2, Argon + CO_2 + O_2).
- used for welding mild steels.

Wire diameter (in mm)	Thickness to be welded (in mm)
0.8	up to 2 mm
1.0	from 2 to 8 mm

2.1.4 Equivalent steel grades

The classes relate to hot rolled steel plate with a high yield strength for cold forming, as currently set out in the French and European Standard NF EN 10149-2, which have replaced French Standard NF A 36.231.

	RENAULT TRUCKS Specification 31.09-402
	Class C
UTS in N/mm^2 min. YP at 0.2% in N/mm^2 min. E % min. KCV at - 20°C J/cm^2 min., longitudinal Bending, transversal Grain size	450 355 23 35 1 e N° 5
= European equivalent French standards	S 355 MC NF EN 10149-2
= German standards equivalent DIN	QStE 380 TM SEW 092
= British standards equivalent BS	43 F 35 BS 1449
= American standards equivalent ASTM	Gr. 50 050 YKL ASTM 607-50
= EURONORM standards equivalent 149-80	FeE355 TM

Sidemember steel classes

The sidemembers cascade down into one steel class:

- class C for all the cases.

Vehicle series EXTRA (E = wheelbase)	Sidemember sections	Steel class			
		C	D	E	F
Van GVW ≤ 5 tonnes	152 x 56 x 4	X			
Van GVW = 5 tonnes	152 x 56 x 5	X			
Chassis cab GVW ≤ 5 tonnes (W/B < 4630)	152 x 56 x 4	X			
Chassis cab (W/B = 4630)	152 x 56 x 5	X			
Chassis cab GVW > 5 tonnes	152 x 56 x 5	X			

GVW = Plated Gross Vehicle Weight

2.2 Reinforcement, extension, reduction of sidemembers

If the bodywork or fitted equipment do not modify the chassis weight and dimensions entered in the descriptive notice, the vehicle can be presented to the Type Approval department without intervention from RENAULT TRUCKS (within the permitted limits in force).

In the event of chassis extension, take care to use a section with size and steel grade identical to those of the sidemembers (consult the chapter “Section and class of sidemember steels”).
Contact the RENAULT TRUCKS Product Applications Department for any further information.

2.2.1 Bans

It is absolutely forbidden to weld onto sidemembers, except for reinforcement, extension, reduction, and the following instructions must be observed:

- Do not weld on the edges of flanges.
- Do not weld in sidemember bending radii.
- In the case of flat irons: no directly opposing welds on the two faces of the same web - only “alternate” or “plug” welds are authorized.
- No welds which are less than 15 mm from the edge of a hole.

Insofar as possible, we advise you to have modifications of the lengths of sidemembers carried out by specialists.

- The general rules for welding in the paragraph entitled “General Principles of Welding” must be strictly followed.

Only conversions (extensions or reductions) rendering the modified vehicle completely in conformity with a type approved chassis are permitted without additional testing, with certification from the vehicle manufacturer.

2.2.2 Reinforcement of sidemembers

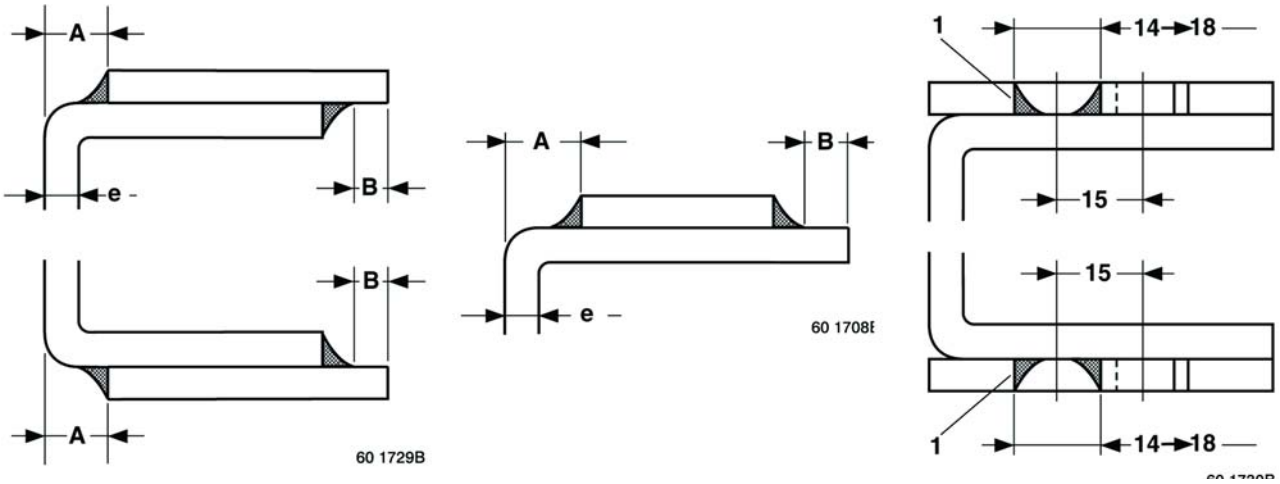
For inner reinforcements and chassis flange stiffeners, the thickness should be the same as the thickness of the sidemember.

NOTE

The steel grade must be identical to that used for the sidemember.

Examples of reinforcements

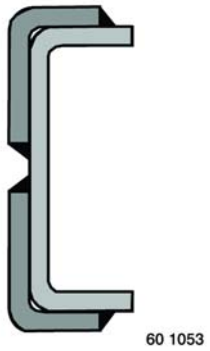
Sidemember upper and lower stiffeners



A: Offset of the stiffener in relation to the external face of the sidemember
B: Offset of the stiffener in relation to the edge of the sidemember
e: Thickness of the sidemember
1: Welds through round or slotted holes, staggered

Thickness of sidemember	A	B
e < 6 mm	10 mm	15 mm

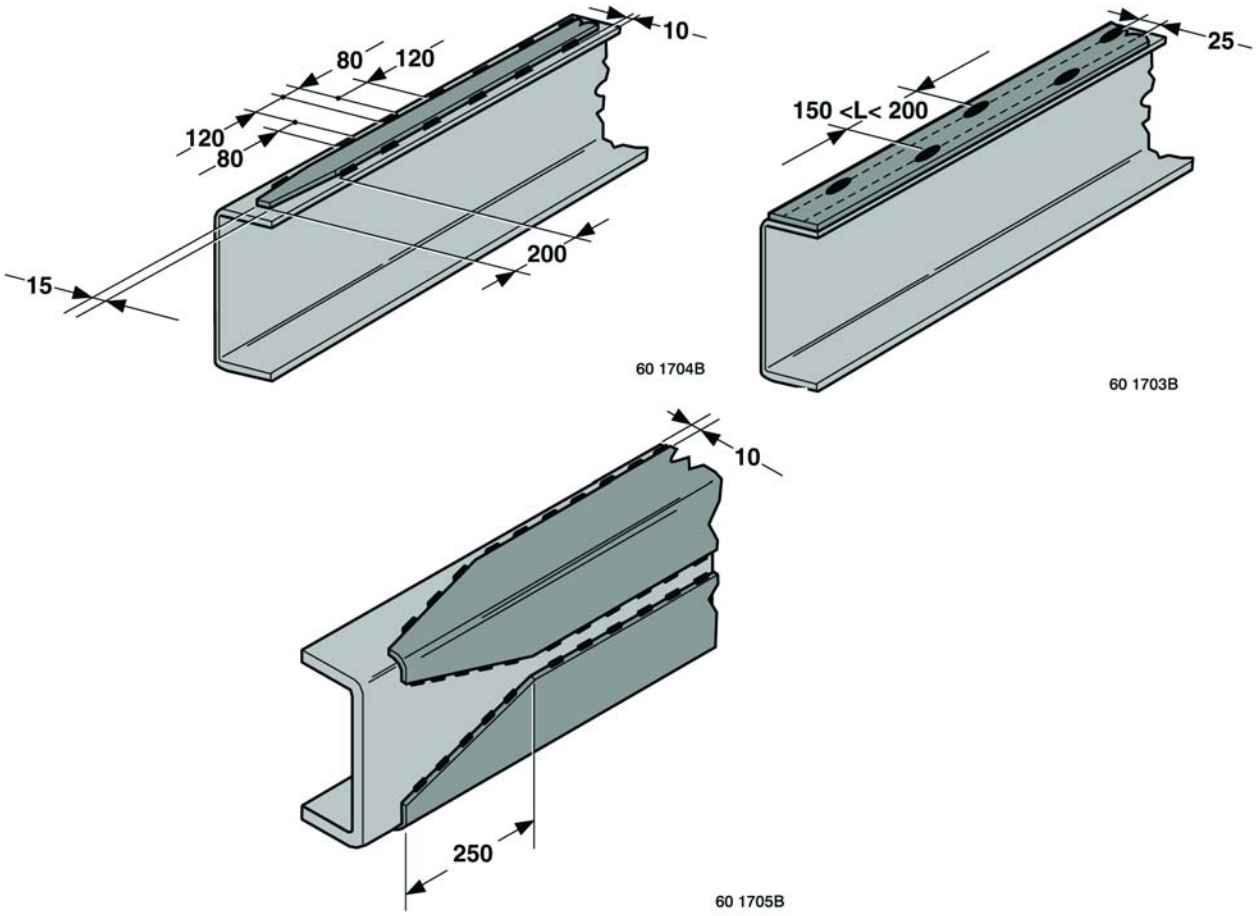
Upper and lower stiffeners using angle-irons



Methods of joining

In the case of stiffeners made from flats (on the upper flange or under the lower flange of sidemembers), we recommend attachment by:

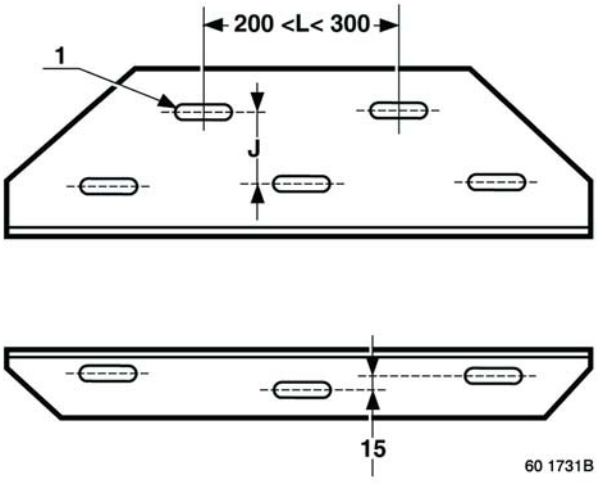
Intermittent beads by electric welding: as guidance, 80 mm beads spaced 120 mm apart and staggered.



"PLUG" welds : as guidance, round holes diameter 14 to 18 mm or slotted (1) holes diameter 14 x 50 mm to 18 x 50 mm at a "pitch" of 200 mm min. to 300 mm. max., staggered, with good quality weld.

WARNING

No vertical welds on sidemember webs. No transversal welds on sidemember flanges.



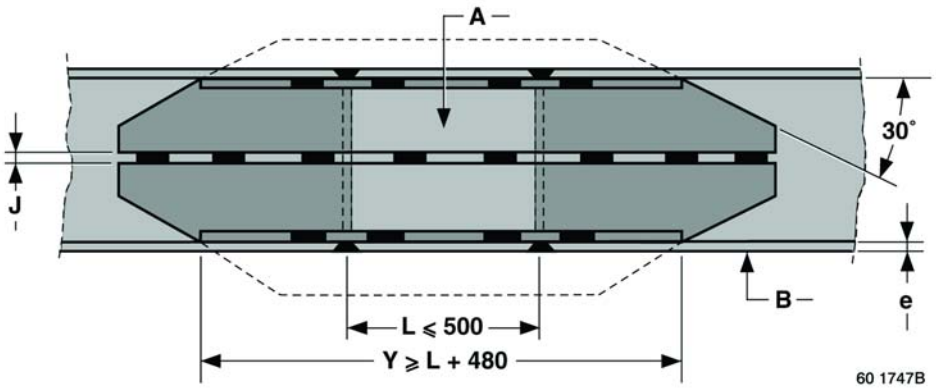
Extension, shortening of sidemembers in the wheelbase

Key

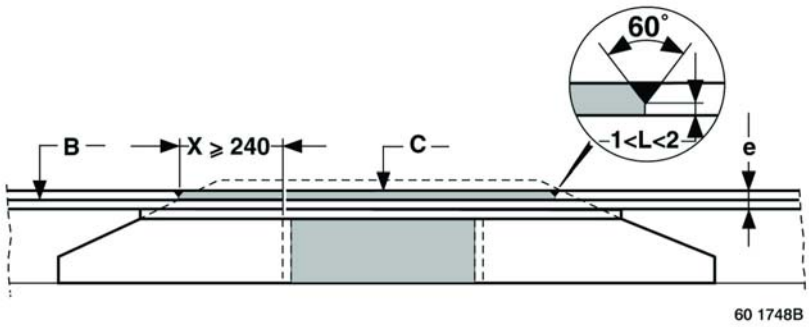
A – Piece of sidemember added (max. length 500 mm)
B – Sidemember
C – Reconstituted stiffener
D – Welds projecting beyond flanged edge with butt-ends then longitudinal grinding (elimination of sharp edges)
e – Thickness of sidemember
F – Angle-iron of thickness (E) max.: E ≤ (e - 1 mm)
G – Welds
J – Weld penetration clearance (about 2 mm)
L – Max. length of extension
X – Min. length of projection of the stiffener measured on the edge of the flange (extension)
Y – Min. length of support of the stiffener measured on the edge of the flange of the sidemember (extension)
Z – Min. length of support of the stiffener measured on the edge of the flange (stiffener without extension).

Extension of sidemembers in wheelbase

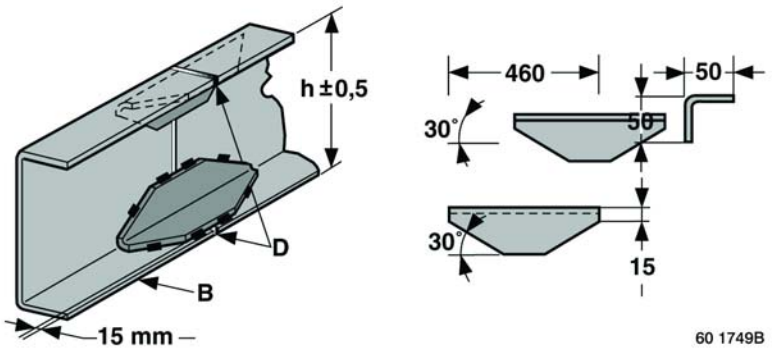
Sidemember without stiffener flat on flange

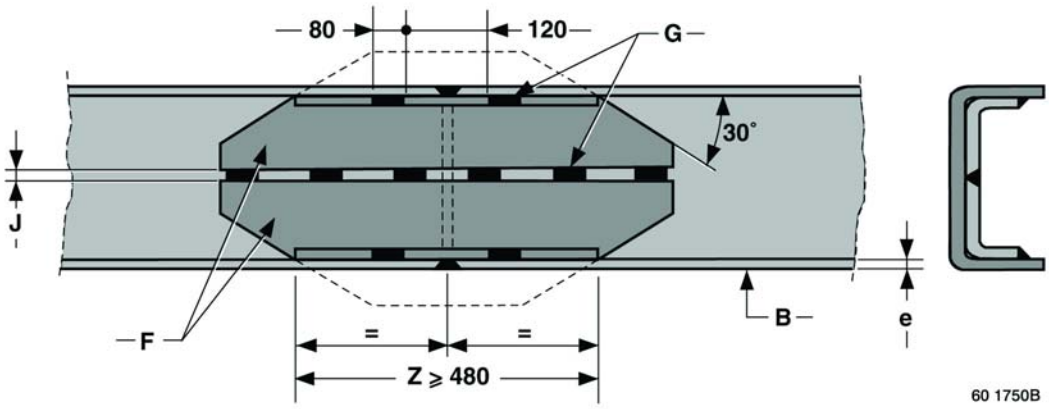


Sidemember with stiffener flat on flange



Shortening of sidemembers in the wheelbase





Attachment of cross-members

Cross-members should be attached with nut and bolt hardware of the 10.9 class with S4S protection as per standard 017140-02 and distributed by RENAULT TRUCKS.

Intermediate cross-members

In the case of extension of the wheelbase or the rear overhang, it is essential to add cross-members, so as not to weaken the rigidity of the frame.
Observe the following instructions:

- Between two cross-members, the spacing must be no greater than the original spacing.
- If the extension to the overhang is longer than 500 mm, the rear cross-member must be moved and an intermediate cross-member fitted which is identical to the others.

2.3 Attachment of bodywork

The bodywork must be correctly attached so that both static and dynamic stresses are freely transmitted without causing excessive local strain, which could prejudice the reliability of the chassis frame or affect the road behaviour of the vehicle.
The following rules apply to the fastening of various standard bodies fitted to our chassis cabs, such as platforms, vans, tippers, and tankers. For special cases, contact the RENAULT TRUCKS Product Applications Department.
For body design (i.e. length, load distribution, location of accessories on sidemembers, etc...) refer to the CD-ROM “Information for Bodybuilders” or the 1:20th scale bodywork drawing which we supply upon simple request.
Fastenings should always be tightened progressively and alternately.
The shape of sub-frames or underbodies should always be tapered towards the front (i.e. at the back of the cab), so as to avoid sudden variations in inertia (refer to chapter entitled “Finishing of sub-frame behind the cab”).

2.3.1 Bans

The following are forbidden:
- Use, drilling or welding of spring hangers.
- Any modification of the chassis, the driveline, or the suspension.
- Fastening of sub-frames to sidemembers by welding.
- Drilling of stiffener gussets.
- Notching of sidemembers, gussets or cross-members.
- With the exception of special cases described in this document, use or modification of vehicle nut and bolt hardware and riveting for the attachment of a body or sub-frame.
- Attachment of sub-frames by U-bolts.
- Modification to type approved regulatory installations (run-under guard, etc...).

All bodies attached by clamps and brackets must mandatorily have 1 inertia stop to the rear of each sidemember to stop the body from moving in the event of fierce braking, as well as 2 body guides at the front.

For bolted fastenings, comply with the following instructions:
- By preference use brackets attached to the chassis.
- Use the fixing bolt holes dia. 11 mm (depending on the particular vehicle), spread out along the length of the sidemembers of the chassis frame.
- Take good note of the attachment principles, set out in the chapter “Attachment of sub-frames”.

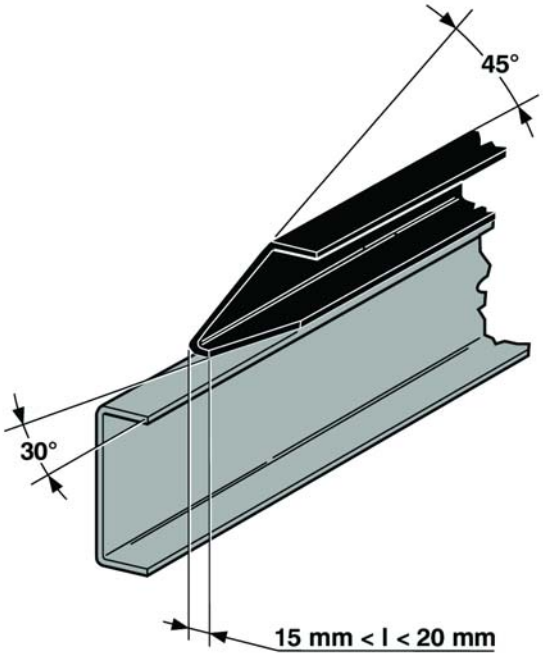
2.3.2 Protection against exhaust heat radiation

Depending on the features of your bodywork or equipment, the fitting of a heat shield on the original protection is recommended.

2.4 Sub-frame

In order to attach bodywork to the frame of the chassis, you should allow for the fitting of a sub-frame whose module of inertia (I/V) is determined in accordance with the vehicle series in question (refer to the section “Special Bodybuilding Features”.
In order to ensure better distribution of the stresses along the sidemembers, you must allow for a cut-out as far forward as possible under the cab.

2.4.1 Finishing of sub-frames behind the cab



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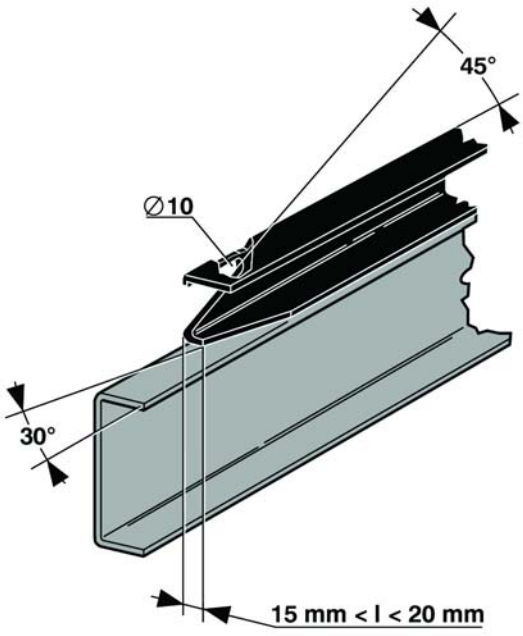

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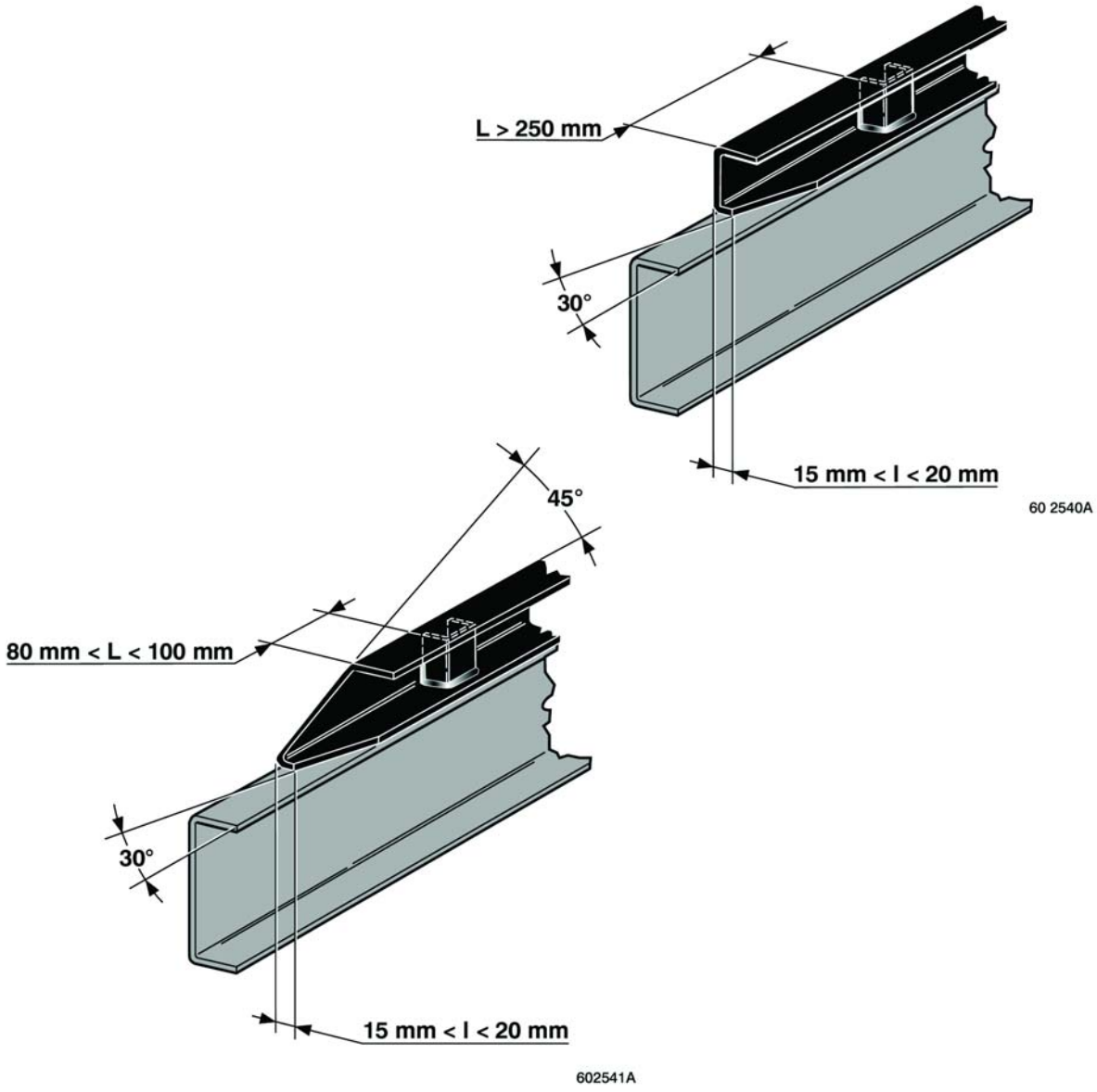
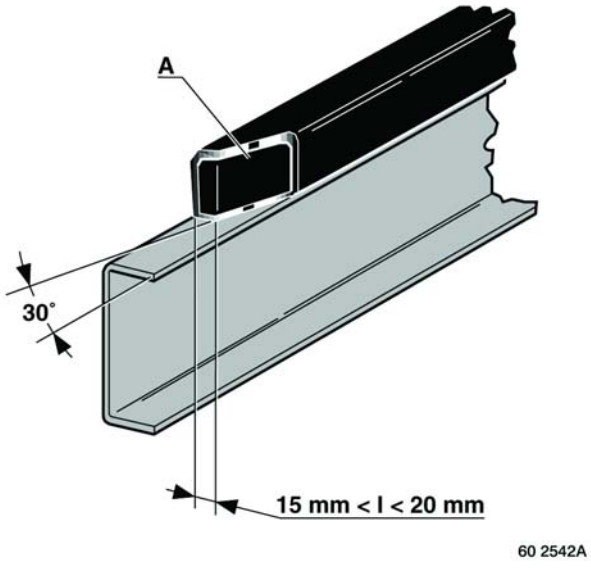


When the sub-frame is constructed of square or rectangular tube section, we also suggest the cut-out shown below.

A - Blank off with 1.5 mm thick sheet metal



2.5 Nuts and bolts and tightening torques for parts in steel and cast iron

The torques indicated in the table are based on Standard 01.50.4002 and apply to new nut and bolt hardware fitted dry, coated with Dacromet and with screw-threads oiled.

Class III is the class covering precision tightening (± 20% of nominal torque) in accordance with Standard 01.50.4002 (coefficient of friction 0.15 ± 0.03).

Tightening torques for conventional "metric system" threaded hardware to standard 01.50.4002 (H: normal, HE: flanged)		
Dia. and pitch of nuts and bolts (in mm)	**Tightening class III**	
	Quality class 8.8	**Quality class 10.9**
6 x 1.00	7.5 ± 1.5	11 ± 2.2
7 x 1.00	15 ± 3	20 ± 4
8 x 1.00	20 ± 4	30 ± 6
8 x 1.25	20 ± 4	27 ± 5.4
10 x 1.00	40 ± 8	60 ± 12
10 x 1.25	40 ± 8	60 ± 12
10 x 1.50	40 ± 8	50 ± 10
12 x 1.25	70 ± 14	100 ± 20
12 x 1.50	65 ± 13	95 ± 19
12 x 1.75	60 ± 12	90 ± 18
14 x 1.50	105 ± 21	155 ± 31
14 x 2.00	100 ± 20	145 ± 29
16 x 1.50	160 ± 32	220 ± 44
16 x 2.00	150 ± 30	220 ± 44
18 x 1.50	240 ± 48	340 ± 68
18 x 1.50	210 ± 42	310 ± 62
20 x 1.50	330 ± 66	480 ± 96
20 x 2.50	300 ± 60	435 ± 87
22 x 1.50	450 ± 90	650 ± 130
22 x 2.50	410 ± 82	595 ± 119
24 x 2.00	560 ± 112	820 ± 164
24 x 3.00	510 ± 102	750 ± 150

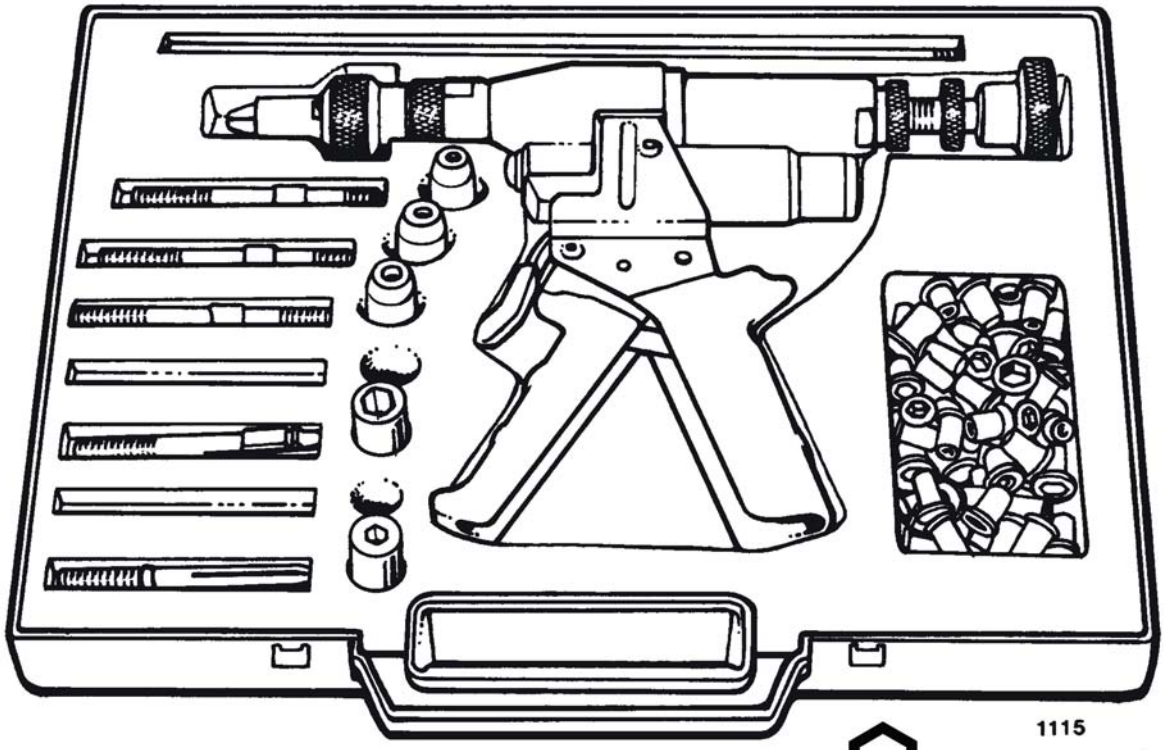
Designation	Characteristics	Spare Part N°
Taper washer	10 x 20 x 2.6	50 03 058 081
	10 x 24 x 2.8	50 03 058 071
	10 x 27 x 2.8	50 03 058 076
	12 x 30 x 3.2	50 03 058 075
	14 x 28 x 3	50 03 058 069
	16 x 32 x 3.4	50 03 058 034
	16 x 39 x 3.6	50 03 058 070
Plain washer	10 x 22 x 3	50 03 053 453
	10 x 27 x 3	50 03 053 455
	12 x 24 x 2,5	50 03 053 026
	12 x 28 x 5	50 10 054 526
	12 x 32 x 2.5	50 03 053 441
	14 x 30 x 5	50 03 053 511
BELLEVILLE cone washer	14.5 x 35 x 1.8	50 10 377 934

Designation	Characteristics	Class of Steel	Spare Part N°	Tightening torque
Nut	10 x 125	10	50 03 032 156	60 N.m
	12 x 125	10	50 03 032 157	110 N.m
	14 x 150	10	50 03 032 159	170 N.m
	16 x 150	10	50 03 032 236	220 N.m
Flanged locknut (DRH)	10 x 125	10	50 03 034 246	60 N.m
	12 x 125	10	50 03 034 248	110 N.m
	14 x 150	10	50 03 034 250	170 N.m

2.6 Addition of equipment to the bodywork

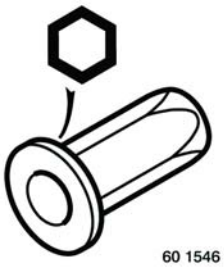
The attachment of equipment to the bodywork must be done with fluidtight crimping nuts.

Tools and crimping nuts



M6 crimp nut - hexagonal barrel

Part N°: 50 03 043 050



Method:

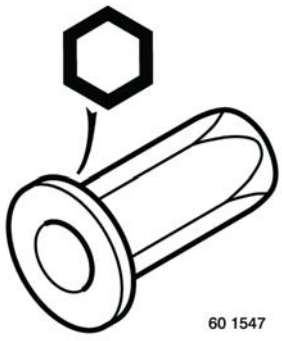
- Drill a dia. 9.2 mm hole (refer to chapter entitled “Drilling of bodywork members for the fitting of accessories”).
- Use the OPEX tooling from OTALU S.A. (RENAULT TRUCKS approval N° 8162).
- Punch out the hexagonal.
- Insert the nut for crimping.

Information:

- Tightening torque: 10 Nm max.
- Length of barrel projecting under bracket after crimping: 17 mm.

M8 crimp nut - hexagonal barrel

Part N°: 50 03 043 052



Method:

- Drill a dia. 11.2 mm hole (refer to chapter entitled “Drilling of bodywork members for the fitting of accessories”).
- Use the OPEX tooling from OTALU S.A.
- Punch out the hexagonal.
- Insert the nut for crimping.

Information:

- Tightening torque: 24 Nm max.
- Length of barrel projecting under bracket after crimping: 21 mm.

2.7 Rear run-under guard

RENAULT TRUCKS obtains type approval for its equipment to cover the requirements of its range. Since the run-under guards are attached by bolting, they are allowed to be moved down along the sidemembers to suit any modifications the chassis may undergo. This must be observed, along with upholding of the attachment method detailed on the 1:20th scale bodywork drawing and compliance with the dimensional requirements under the regulations.
A vehicle which is not equipped at the time of delivery can be fitted afterwards, following a conversion making the fitting compulsory, using items that can be supplied from the Parts Stores of our dealers.

Changing of position of items of equipment

Modifications of a RENAULT TRUCKS vehicle for the fitting of bodywork and equipment require technical approval to be obtained from the RENAULT TRUCKS Product Applications Department.

3. SPECIFIC EQUIPMENT FEATURES

3.1 Running the engine when vehicle stationary

Under the conditions of running an engine for a long period under load, it is vital to fit an additional cooler unit in order to keep the temperature of the engine at a normal level (water temperature approx. 80° C).
The prolonged use of the engine under these conditions can cause malfunctions which could adversely affect the service life of the engine.

3.2 Mounting of power take-offs and flanged pumps

RENAULT TRUCKS power take-offs (PTOs) and their adapter kits should be ordered from the RENAULT TRUCKS Spare Parts Department. In order to carry out the fitting, refer to the specific information circulars that are available from the Product Applications Department.
Bearing in mind the weight and the large overhang required for certain PTOs having flanged pumps, the rear of these units should be supported by a suitable bracket attached to the rear of the gearbox.

Comply with standard NF ISO 7653.

IMPORTANT

It is compulsory at the time of fitting a power take-off to ensure that there is a certain amount of play in the setting adjustment, so as to allow an ideal backlash (namely 0.15 to 0.25 mm) then to fit a gasket or apply paste in order to achieve a good seal and also to top up the oil level. (Refer to the vehicle maintenance handbook).
Refer to our Product Information Sheet and 1:20th scale bodywork drawing on “power take-offs”, which can be requested from our Product Applications Department.

3.3 Front power take-offs (crankshaft nose)

RENAULT TRUCKS pre-arrangement

For belt drive units, pulleys with extra grooves fitted to the engine may be available according to the power unit.
Consult the Product Applications Department to obtain the relevant information and technical approval for the assembly.

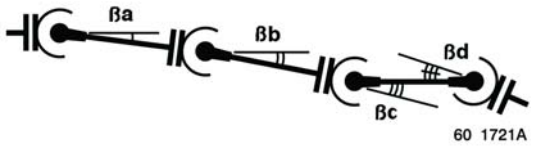
3.4 Front and rear power take-offs

3.4.1 Propeller shaft alignment

In order to achieve satisfactory propeller shaft alignment, several minimum basic **criteria** have to be observed.

Angularity criteria (or: equivalent angle of inclination β_E permissible for all articulations).
This angle β_E must comply with the following condition:

$$\beta_E = \sqrt{|\beta_a^2 \pm \beta_b^2 \pm \beta_c^2 \pm ...|}$$
$$\beta_E \leq 3°$$

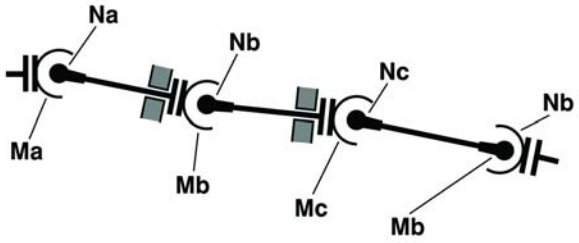


Rule for sign β:
Yoke N° 1 is to be considered as the reference yoke.

β > 0 when the leading yokes are parallel to the first leading yoke (Ma).

Example 1:

$$\beta_E = \sqrt{|\beta_a^2 + \beta_b^2 + \beta_c^2 - \beta_d^2|}$$

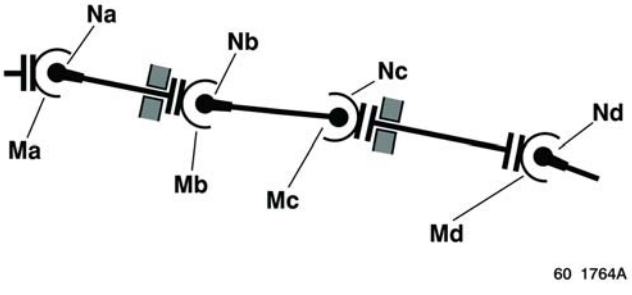


M - Leading yokes
N - Trailing yokes

β < 0 when the leading yokes are perpendicular to the first leading yoke (Ma).

Example 2:

$$\beta_E = \sqrt{|\beta_a^2 + \beta_b^2 - \beta_c^2 + \beta_d^2|}$$



Angular acceleration criteria θ_1

Calculated criterion for a theoretical maximum speed of rotation (N).

$$\theta_1 = \left(\beta_E \times \frac{\pi}{180}\right)^2 \times \left(\frac{\pi \times N}{30}\right)^2$$

$$\theta_1 \leq 270$$

θ_1 : criterion of acceleration in rd/s²
N : max. speed of rotation in rpm

NOTE

This value is calculated without dynamic amplification of the prop shaft tubes and bearings

Measured criteria θ_2:

The angular acceleration or torsional vibrations criteria value θ_2 must not exceed 1500 rd/s² at the PTO output or at any point whatsoever of the driveline for a downstream inertia of "I" such that I ≤ 0.2 kg/m².

$$\theta_2 \leq 1500 \ \frac{rd}{s^2}$$

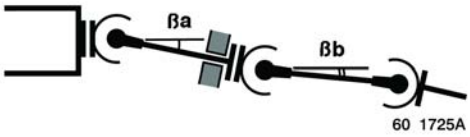
NOTE

This limit value θ_2 takes into account possible dynamic amplification of the driveline.

Transversal stress criteria for prop shaft tubes and bearings

Example β_a and β_b maximum not to be exceeded.

- **β_a < 2°** for a prop shaft with bearing.
- **β_b < 7°** for a prop shaft with sliding yoke.



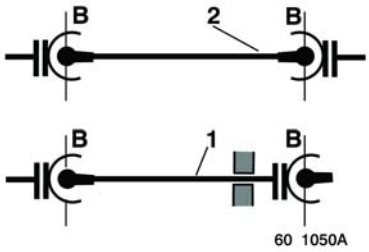
NOTE

If this 7° value has to be exceeded for space or clearance reasons, the vehicle manufacturer must be consulted.

3.4.2 Propeller shaft balancing

Permissible imbalance value (B):

$$B \leq 3 \frac{g \times cm}{kg}$$ per balancing plane

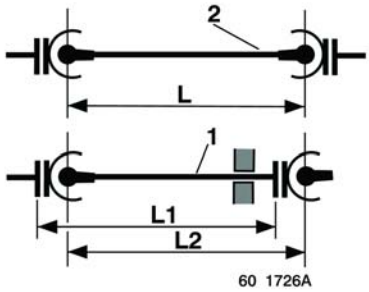


1 - half prop shaft
2 - prop shaft

NOTE
g = m = 10 m/s^2

3.4.3 Calculation of maximum permissible length of a prop shaft as a function of the rotating speed (L, L1 or L2)

L: Distance between centres of articulation of a prop shaft.
L1: Distance between centres of articulation welds of a half prop shaft.
L2: Distance between centres of articulations of a half prop shaft.
L1 = L2



$$L = \sqrt{\frac{K}{Nt \times 1,2}} \quad \text{with} \quad K = 0.75 \times 1.22 \times 10^5 \times \sqrt{D^2 + d^2}$$

Nt = prop shaft maximum operating speed
1.2 = safety coefficient
D = prop shaft large diameter
d = prop shaft small diameter

3.5 Vehicle driveline (powertrain)

Any modification to the driveline is forbidden. For special cases, agreement must be obtained from the RENAULT TRUCKS Product Applications Department.

Any propeller shaft modifications must only be carried out in conformity with the requirements of paragraphs 3.4.2 and 3.4.3.

3.6 Mounting of handling cranes

The installer of the crane is responsible with regard to compliance with the regulations, and also for the stability of the vehicle. The recommendations of RENAULT TRUCKS are only concerned with the attachment of the equipment.

3.6.1 Mounting on the sub-frame

The mounting of a crane on the chassis behind the cab or in the rear overhang requires the fitting of a specific sub-frame.

The sub-frame module is defined in the graph of inertia in accordance with the lifting torque only for a crane mounted behind the cab and on rigid or drawbar rigid vehicles (refer to the next page).

For all mountings of cranes in the rear overhang, off-limits and on tractors, consult the RENAULT TRUCKS Product Applications Department.

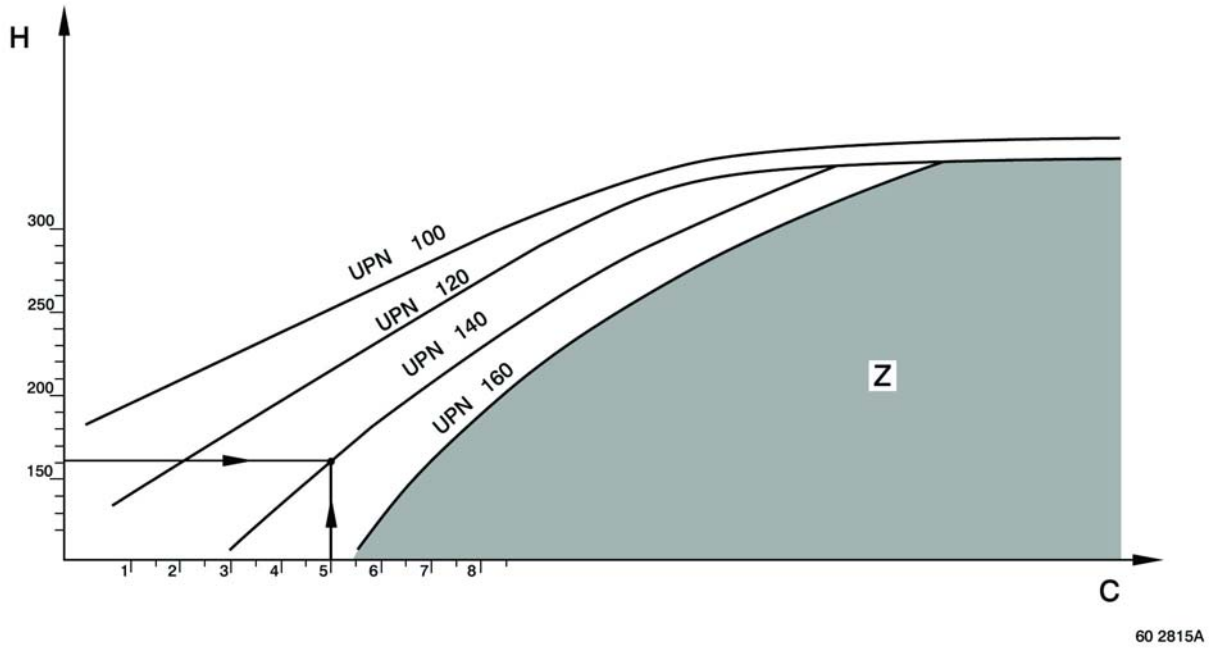
The sub-frame must be in one single piece, starting from the rear of the cab, and extending as far back as the rear tip of the overhang. The front end must be finished in a single or double bevel (refer to the chapter entitled “Finishing of the sub-frame behind the cab”).

Should the crane be mounted in conjunction with another item of mobile equipment, one single sub-frame shall be designed in accordance with the item of equipment that places the most strain on the sidemembers.

3.6.2 Graph of the moment of inertia of the sub-frame as a function of the lifting torque

Example:

A chassis with sidemembers 162 mm high, fitted with a crane having a lifting capacity of 5 tonnes per metre.
The chassis requires a sub-frame built of size 140 U-section (channel) beams (— direction of reading).
The U-section beams (UPN) can be replaced by any other steel section offering equivalent total inertia (I/V).



C - Crane lifting torque (tonnes/metre)
H - Height of sidemember
Z - Off-limit zone

UPN 100: I/V = 41,200 mm^3
UPN 120: I/V = 60,700 mm^3
UPN 140: I/V = 86,400 mm^3

WARNING

Before undertaking the mounting of a crane on a vehicle, it is essential to make calculations to check the load distribution, and to determine the new maximum body length of the vehicle, whilst complying with:

- The plated gross vehicle weight (GVW).
- The maximum plated axle loads.
- The maximum rear overhang indicated in the Type Approval Department's descriptive sheet and the bodywork diagram.

Should such limits be exceeded and in all cases where the work does not comply with the type approval department descriptive sheet, special authorization must be requested from the RENAULT TRUCKS Product Applications Department.

In addition to this, the bodybuilder will be responsible for commissioning the equipment.

3.7 Tail lifts

3.7.1 Sub-frames

In the majority of cases, the mounting of a tail lift involves the fitting of a sub-frame to the vehicle. Such a sub-frame must reinforce the entire length of the chassis, with the bevelled front end being located as far forward as possible under the cab.

The module to be used for the sub-frame must be determined for tail lifts:

- without landing legs, for a capacity of 400 to 1,000 kg
- with landing legs, for a capacity of 1,000 to 2,000 kg

by referring to the graph of inertia of the sub-frame depending on the load to be lifted, plus the information contained in the paragraph entitled “Special Recommendations”, which also deals with tail lifts with a capacity of 1,500 kg without landing legs and tail lifts with a capacity of 2,000 kg with or without landing legs.

3.7.2 Attachment

The tail lift is to be fastened in position with bolted plates. In all cases, the design of the attachment should involve that of the body sub-frame as well.

If necessary, it may be necessary to wedge the tail lift beam or plate on the lower flange chassis sidemember, so as to avoid flexing of the sidemember.

NOTE
Do not weld the plates to the chassis.

Tail lift type	Sub-frame	Min. sub-frame inertia	Attachment to sidemember	Attachment to sub-frame
500 kg	80 x 60 x 4 steel class C	8.2 10^{5}	2 x 6 nuts & bolts in 2 rows	welding recommended (or 2 x 3 nuts & bolts)
750 kg	100 x 60 x 4 steel class C	1.4 10^{5}	2 x 6 nuts & bolts in 2 rows	welding recommended (or 2 x 3 nuts & bolts)
1000 kg	120 x 60 x 4 steel class C	2.3 10^{6}	2 x 8 nuts & bolts in 2 rows	welding recommended (or 2 x 4 nuts & bolts)

WARNING
In all cases of conversions for tail lifts, it is absolutely essential to calculate the new length of body, to ensure compliance with:

- Maximum plated gross vehicle weight (GVW).
- Minimum load on front axle, with the vehicle fitted with its body and equipped with tail lift (the load on the front axle should be more than 40% higher than the load on the rear axle).
- Maximum plated loads on front and rear axles.
- Maximum rear overhang indicated in the Type Approval Department’s descriptive sheet and the bodywork diagram.

If any loads are exceeded, consult the RENAULT TRUCKS Product Applications Department.

3.7.3 Electrical connections for a tail lift

Electrical connections should comply with the recommendations set out in the chapters entitled “Fitting of specific equipment” and “Electrical equipment”.

3.7.4 Graph of the moment of inertia of the sub-frame as a function of the lifting load

How to use the graph

- Draw a straight line joining the type of tail lift in question (lower part of the graph) to the mark corres ponding with the height of the sidemember in mm.
- Draw a straight line from the value of the sidemember height.
- Read the value for the sub-frame at the intersection of these two lines.

NOTE

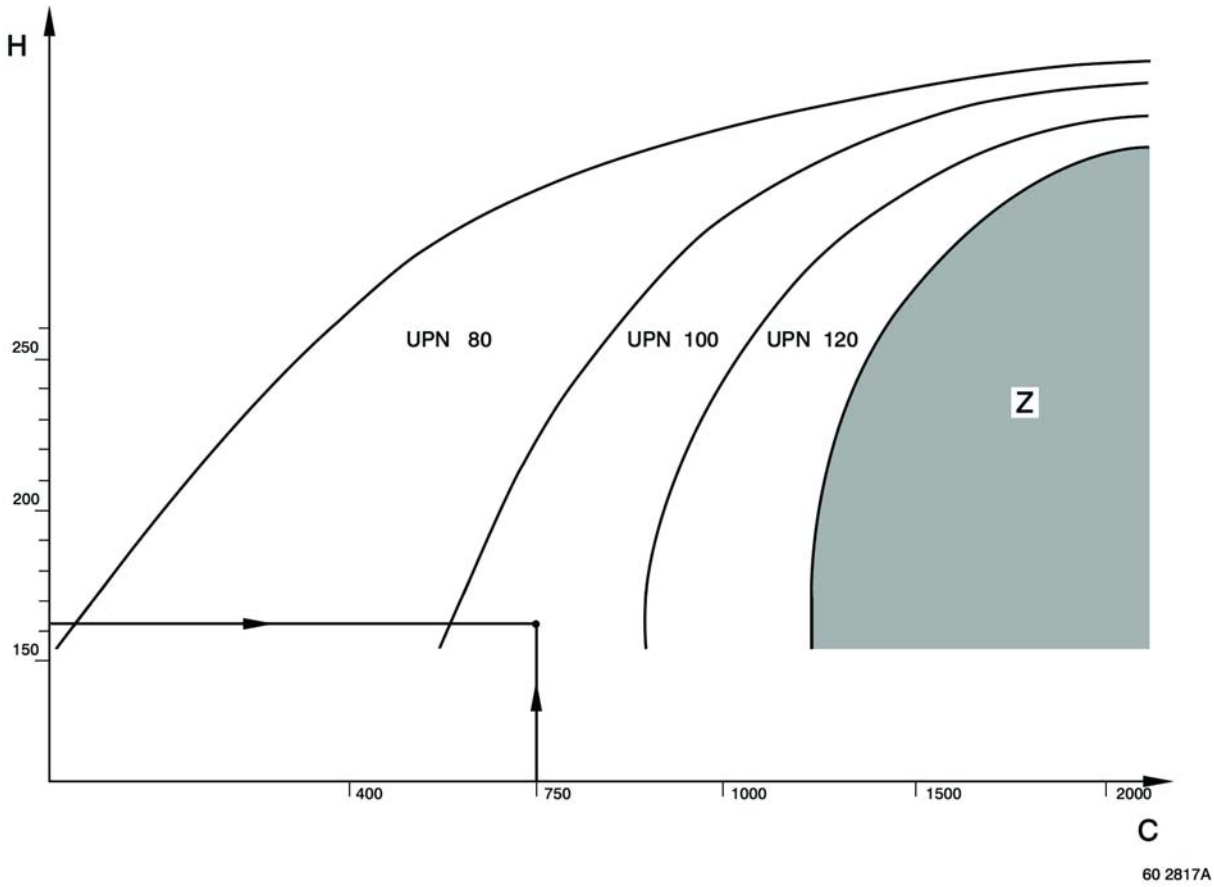
For the mounting of tail lifts on 6x2 vehicles, it is essential to consult the RENAULT TRUCKS Product Applications Department.

Example:

Take a chassis with 162 mm high sidemembers, equipped with a 750 kg tail lift.

It requires a sub-frame made of size 100 U-section (channel) beams.

Height of sub-frame



C - Tail lift capacity
H – Sidemember height
Z – Off-limits zone

NOTE

The U-section beam can be replaced by any other section which gives an equivalent inertia (I/V).

UPN 80: I/V = 26,500 mm^3
UPN 100: I/V = 41,200 mm^3
UPN 120: I/V = 60,700 mm^3

3.8 Sub-frame box sections

The recommended box sections should:

- be constructed in sheet metal which is **as thick or thicker** than that used for the sub-frame.
- stretch **over the entire rear** of the sub-frame, starting **gradually at least one metre** in front of the foremost spring hanger of the rear spring

WARNING

If the sub-frame is to be constructed in a material other than commercially available U-section beams, we approve all other sections on condition that the modulus of inertia of the “truck sidemember + sub-frame” section, measured at the centre-line of the rear axle, be at least equal to the modulus which we recommend (refer to the previous page).

It is forbidden to make any butt welds on the sub-frame in the area defined as follows:

- from the centre-line of the rear axle up to 500 mm to the rear of the rearmost spring hanger of the rear spring, in the case of 4x2 and 4x4 vehicles.
- from the centre-line of the middle axle up to 500 mm to the rear of the centre-line of the rear axle, in the case of all other axle spreads.

3.9 Fitting of specific equipment (for example: refrigerator unit, tail lift)

3.9.1 Electrical connections

Refer to the recommendations for use (chapter on “Electrical equipment” in "General Features").

The power supply cable should be in one single piece, with a cross-section calculated for a max. rating of 5 Amps per mm^2. The power supply must be protected by a fuse and controlled by a specific master switch during fitting. It is compulsory for the cables to be connected to the battery terminals. The fuse and the master switch must be located as close to the battery connection as possible (in order to keep to a minimum the length of unprotected line).

The electric power and auxiliary wiring must compulsorily be independent from that of the vehicle network.

For this purpose, you should contact the Product Applications Department in order to obtain its permission.

In the case of conversion of an independent self-contained unit on the front end of the body, an access ladder and platform for maintenance purposes should be provided.

3.9.2 Installation of receivers or generators with a voltage of more than 24 V

Comply with the standards in force and with the safety regulations covering installations and safety of the person (decree dated 14/11/1988). The protective earth is to be made on the equipment, and never on the vehicle structure.

3.10 Tapping on the diesel fuel tank

It is forbidden to drill the tank for the installation of a tapping point.

CHAPTER -B-
“RENAULT MASCOTT”
SPECIAL BODYBUILDING FEATURES

1. PRESENTING THE “RENAULT MASCOTT” SERIES

This RENAULT MASCOTT series covers GVW* from 3.5 to 6.5 tonnes.
The bodybuilding function is optimized thanks to a chassis frame structure featuring straight sidemembers of the ladder type (high yield strength steel) with smooth flanges over the entire length and brackets positioned all along the sidemembers.
The series offers a wide choice of possible configurations, thus meeting the most diverse needs.
The main variants are as follows (according to equipment):

Chassis cab

- 2- to 3-place single cab,
- up to 7-place double cab,
- chassis cowl,
- 4 wheelbases: 3130, 3630, 4130, 4630 mm,
- 4 tonnages: 3500, 5000, 5500, 6500 kg GVW*
- towing device.

Van

- 2 wheelbases: 3630 mm (12 m^3), 4130 mm (14 m^3),
- 3 tonnages: 3500, 5000, 5500 kg GVW*
- RH and/or LH sliding door,
- driving position rear bulkhead, panel body.

Its other attributes are:

Performance

- braking featuring 4 disc brakes,
- 5-speed gearbox for 85 kW power rating,
- 6-speed gearbox for 115 kW power rating.

Safety

- engine immobilizer,
- “ABS”, "MSR" anti-lock braking system,
- "ASR" anti-slip regulation,
- parabolic leaf spring suspension at front and rear,
- twin rear wheels,
- roof lights.

Driving comfort (depending your vehicle's equipment)

- air conditioning,
- heat-reflective windscreen,
- electric window winder, remote controlled heated rearview mirrors and central door locking,
- driver’s suspension seat,
- cruise control.

Modularity

- electrical pre-arrangement for bodybuilder,
- gearbox-mounted power take-off and fast idling control,
- pre-arrangement for engine pulley-mounted power take-off,
- pre-arranged drillings for reducing the overhang,
- dropped suspensions,
- 2 maximum overall widths,
- high power electrical circuit (alternator and battery),
- rear drive axle with differential lock.

* GVW = Plated Gross Vehicle Weight

1.1 Make –up of the series

Engine

Depending on your vehicle's equipment

Turbocharged intercooled
(MASCOTT – 120 DXI)
"NISSAN ZD 30"

Power setting	ZD3A600
Capacity	2,953 cm^3
Bore / stroke	96 / 102 mm
"BOSCH" fuel-injection equipment	COMMON RAIL
Injection order	1.3.4.2
Exhaust gas recycling	EGR
Max. no load speed	4000 rpm
Idling speed	750 rpm

Turbocharged intercooled
(MASCOTT – 160 DXI)
"NISSAN ZD 30"

Power setting	ZD3A604
Capacity	2,953 cm^3
Bore / stroke	96 / 102 mm
"BOSCH" fuel-injection equipment	COMMON RAIL
Injection order	1.3.4.2
Exhaust gas recycling	EGR
Max. no load speed	4000 rpm
Idling speed	750 rpm

Engine oil capacities:

Engine dry	11.5 litres
With filter exchange	10.9 litres

Clutch:

Depending on your vehicle's equipment

235 DTR
280 DTR

Gearbox:

Depending on your vehicle's equipment

ZF 5 S 270
ZF 6 S 350

Gearbox oil capacities:

ZF 5 S 270 gearbox	2.2 litres
ZF 6 S 350 gearbox	2.7 litres

Power take-off:

Depending on your vehicle's equipment

HYDROCAR 22Z1
HYDROCAR 22Z2

Power take-off oil capacities:

Power take-off	0.4 litre

Prop shafts:	Tubular shafts with universal joints
Front axle:	E 22
Front axle:	
Depending on your vehicle's equipment	
	569
	669

Drive axle oil capacities:

569 axle pan	4.2 litres
669 axle pan	5.5 litres
Wheel hubs	2 x 0.2 litre

Steering:	TRW TAS 30

Steering system oil capacities:

Hydraulic power steering system	1.5 litres

Front suspension:	Leaf springs
	Hydraulic shock absorbers
Depending on your vehicle's equipment	
	Anti-roll bars
Rear suspension:	Leaf springs
	Hydraulic shock absorbers

Anti-roll bars set:

At the scheduled intervals, check the play between the bushes and the anti-roll bars.

The play should not exceed 2 mm.

Suspension components:

The shock absorbers do not require any special maintenance.

However, at the scheduled intervals, remove the shock absorbers and get their operation checked out by a specialist.

Suspension spring U-bolt tightening torques:

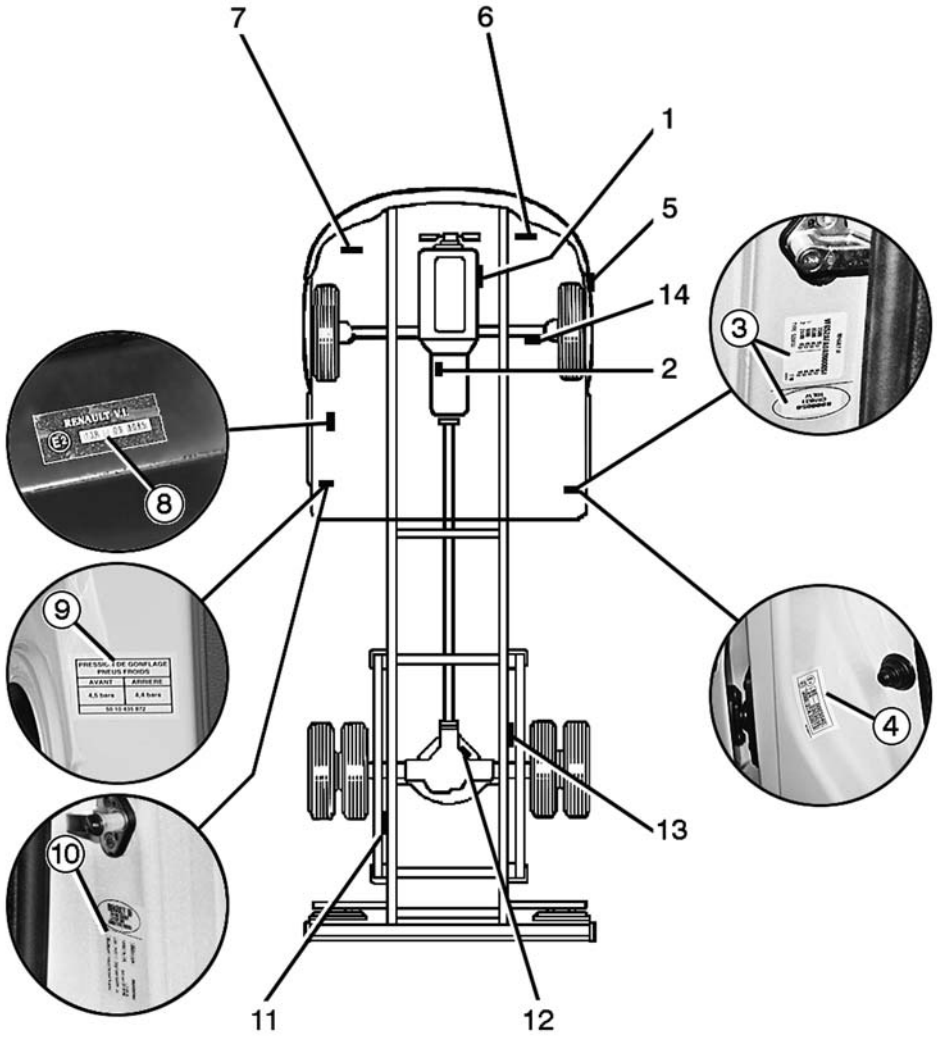
At the front:	160 Nm
At the rear:	230 Nm

Brakes:	Hydraulic with 4 discs
Depending on your vehicle's equipment	
	"ABS", "MSR" anti-lock braking system
	"ASR" anti-slip regulation
Electrics:	12 Volts voltage
Depending on your vehicle's equipment	
Batteries:	105 Ah
Alternator:	"MITSUBISHI" 120 A
	"HITACHI" 135 A
Starter:	"HITACHI"

2. GENERAL REMARKS ON THE “RENAULT MASCOTT” SERIES

2.1 Identification of the vehicle

View from above



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1 - Engine
2 - Gearbox
3 - Manufacturer’s plate
CAM reference
Paint reference
4 - Engine type approval
5 - Tare plate
6 - Airbag precautions (in sun visor)
7 - Handbrake precautions
8 - ABS
9 - Tyre pressures
10 - Tachograph
11 - Bodybuilder recommendations
12 - Rear drive axle
13 - Chassis
14 - Front axle

IMPORTANT
The identification markings must remain visible and accessible without need for removing any bodywork component.

2.2 Tyres

Features

Depending on your vehicle's equipment

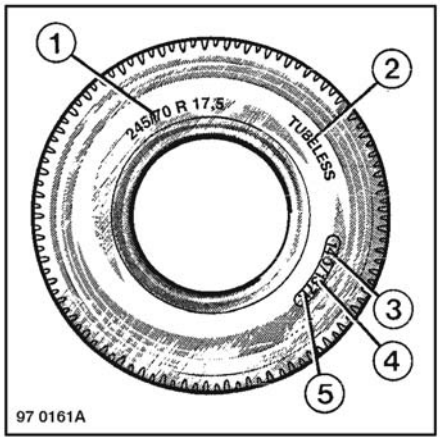
1 - Tyre type

2 - Tubeless

3 - Load index: single fitment

4 - Load index: twin fitment

5 - Tyre max. speed symbol



NOTE

Follow the tyre manufacturer's recommendations. If they are not available, temporarily use the following pressures given for guidance purposes.

For chassis intended to receive equipment liable to modify loads per axle, refer to the manufacturer's data according to make, type and usage.

Comply with the loads/speed index marked on the sidewallof the tyre.

Tyre type	Load in kg according to fitment		
	Single	Twin	Pressure in bar
185/75 R 16	1 300 1 640 1 800	2 440 3 080 3 400	3.0 4.0 4.7
195/65 R 16	1 440 1 600 1 745 1 800	2 660 3 020 3 295 3 400	3.5 4.0 4.5 4.75
195/75 R 16	1 350 1 560 1 760 1 950	2 565 2 965 3 345 3 700	3.0 3.5 4.0 4.75
205/75 R 16	1 520 1 820 2 120	2 850 3 420 4 000	3.0 3.75 4.75
205/80 R 15 P	1 600	3 000	7.25
215/75 R 16	2 040 2 300 2 500	3 920 4 360 4 720	4.0 4.5 5.25

Principal causes of premature tyre wear

- Manner of driving (excessive braking, driving through potholes, etc…).
- Overloading of the vehicle or bad distribution of loads.
- Over-inflation or under-inflation (inflate to a pressure corresponding to the weight per axle).
- Incorrect pairing (always twin tyres of the same size, type and with the same degree of wear).
- Incorrect front axle geometry.

Checking tyre pressures

Frequency:

The tyre pressures must be checked regularly.

Method:

The tyre pressures must always be checked when the tyres are cold.

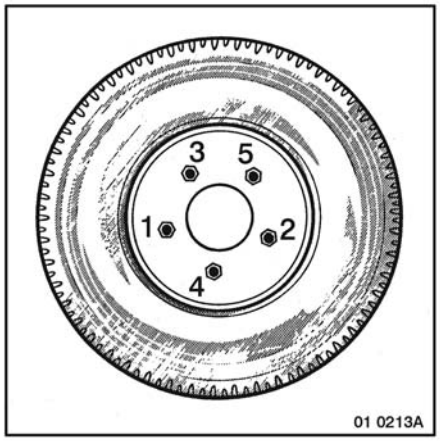
It is essential to never deflate hot tyres.

Safety:

In-service incidents

In the event of a tyre hitting an obstacle or if it is necessary to stop as the result of a puncture, it is essential to get the tyre immediately checked by a specialist.

2.3 Tightening the wheel nuts



Steel wheels

Wheel nuts tightening torque:

360 ± 36 Nm.

Tightening sequence

- Disc wheels

Changing a roadwheel

Precautions to be taken when fitting wheels on the vehicle:

Before fitting

Carefully clean the wheel naves and hubs. In particular, clean all contacting parts (remove all grease, earth, mud, metal burrs, excess paint, etc…).

Upon fitting

Lightly lubricate the studs and nuts (engine oil).

Tighten the nuts gradually using the wheel nut spanner provided in the onboard tool kit.

Correct tightening is obtained by pulling the tool lever arm.

IMPORTANT
Overtightening may cause damage. Do not use tubes, bars or other devices to increase the leverage.

In-service checks

Check the tightness of the wheel nuts after fitting a new wheel or after a wheel change:

- after 20 to 30 km, then between 150 and 250 km.

NOTE

Failure to carry out these elementary precautions may result in loosening of the wheel nuts and lead to serious consequences.

NOTE

Your vehicle is equipped with a specific tyre fitment.

Whenever you want to change the fitment, ensure with your dealer or approved agent that the new fitment is compatible with your vehicle.

2.4 Anti-lock braking system (ABS)

NOTE

If you change your vehicle's tyre fitment, it is absolutely essential to redefine the parameters in the ECU using the RENAULT TRUCKS tool.

2.5 Batteries

NOTE

Before working on the electrical system, disconnect the batteries. Always remove the negative (-) terminal first.

Checking

Prior to checking the electrolyte level, clean the filler plugs and their surrounds.

The electrolyte level must stay at 3 cm above the plates. Top up with distilled water, if necessary.

Resistance to freezing depends on the state of charge.

The available capacity of a fully charged battery varies with temperature as follows:

- 100% at 27°C
- 66% at 0°C
- 41% at -20°C

Never use a naked flame near the cell vents (risk of explosion).

Checking the state of charge

Carry out this operation on a battery while in the idle state (battery not having been charged for 2 hours) or after a run:

Switch on the headlights for 5 minutes, switch them off and wait for 3 minutes before making the check. Measure the voltage across the terminals (battery isolation switch contacts fully open) (see table below).

This should be slightly higher than the rated voltage.

A lower voltage indicates that the battery needs recharging.

To ascertain the exact condition of the battery, use a battery tester.

Trickle charge the batteries at 1/10th of their capacity for 10 hours.

No-load voltage (V)	Specific gravity (g/cm³)	State of charge (%)	Temperature withstood (°C)
12.8	1.273	100	- 70
12.6	1.241	80	- 45
12.4	1.205	60	- 35
12.2	1.170	40	- 20
11.9	1.130	20	- 15
11.7	1.080	0	-5

If the state of charge is below 80%, recharge the batteries and conduct an electrical check-up on the vehicle.

If a battery has to be removed, always disconnect the negative (-) terminal first.

When refitting a battery, always start with the positive (+) terminal.

Terminal post tightening torque: 0.65 daNm.

Maintenance-free batteries

For commercial vehicles, this type of battery does incorporate filler plugs. Take the same precautions as for ordinary batteries. However, the trickle charging current should not exceed 1 Amp.

Before using a charger, do not forget to disconnect the batteries. If starting with an auxiliary battery, make sure to connect the (+) terminal of the auxiliary battery to the (+) terminal of the vehicle battery and the (-) terminal of the auxiliary battery to the (-) terminal of the vehicle battery.

Problems with electrical equipment on tractor vehicles are very often caused by deficiencies due to installation of the trailer electrical system. Before connecting to a trailer, carefully check that its electrical system is in order, to avoid blowing of fuses, and pay particular attention to the earth connection.

IMPORTANT
Overloading the electrical system by adding bulbs or supplementary or more powerful equipment than that for which the system was designed may cause extremely serious damage to all the equipment installed and may produce abnormal discharging of the batteries. Such action will invalidate the manufacturer's warranty.

Rational use of batteries

Only fully charged batteries will allow you to start your engine properly.

The original battery / alternator unit enables different electrical equipment to be used and gives optimum battery charging.

Get the charging capacity of your batteries checked regularly. It diminishes in cold weather. In winter, only use necessary electrical equipment.

If numerous accessories (refrigerator, coffee maker, micro-wave oven, television set, independent heater, etc...) are fitted to the vehicle, it is considered necessary to fit batteries with a higher rated capacity. Take advice from your dealer.

The capacity of a battery is expressed in Ampere-hours (Ah).

The consumption of an electrical appliance in amperes (A) is connected with the time of use.

Example: Television set (2A) x 2 hours = 4 A/h.

Engine running:

The alternator supplies the energy; the batteries compensate, if necessary.

Engine shutdown:

Only the batteries supply the energy.

Limit your consumption and realize that a minimum of 50% of the battery capacity is necessary for starting the engine.

Main appliances and their electrical consumption in 1 hour

- Ignition position = 4 A
- Cab overhead light = 2 A
- Side/parking lights = 5 A
- Refrigerator = 3 A
- "Air" type independent heater = 2 A
- Tail lift = 150 A
- "Air / water" type independent heater = 10 A
- Coffee maker = 10 A

If the forecast calculation reveals a battery discharge of more than 50%, limit the number of appliances or compensate by intermediate charging (engine running at 1500 rpm for at least 1 hour).

NOTE

Batteries connected in parallel: the capacities are added together (2 x 12 V - 14 Ah = 12 V – 280 Ah).

Batteries connected in series: invariable capacity (2 x 12 V - 140 Ah = 24 V - 140 Ah).

Battery charge indicator

This function is performed by a charge warning lamp.

Charge warning lamp: The charge warning light should remain out when the engine is running. If the light stays on, the charging system is defective.

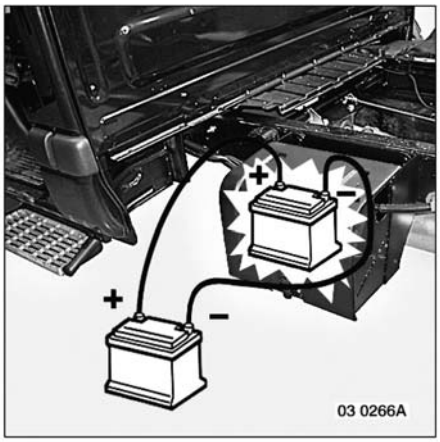
Starting the vehicle using an external power source

If the engine will not start due to discharged batteries, it is possible to use an external power source (battery cart) or another vehicle.

Procedure:

- Switch off the ignition.
- Connect up the battery cart, matching the polarities.
- Switch on the ignition.
- Actuate the starter.
- Run the engine at a speed of 1300 rpm for about 5 minutes.
- Switch on the dipped beam headlights before lowering the engine speed to idling.
- Let the engine run at idling speed for 1 minute.
- Disconnect the battery cart.
- Switch off the headlights.

IMPORTANT
The use of a power charger as starting aid is forbidden (damage to electronic systems). Exclusively make use of the batteries or another vehicle.



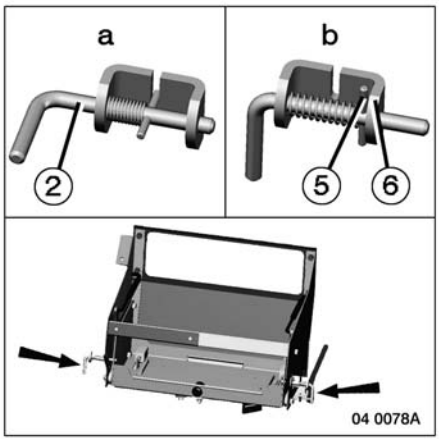
2.6 Access to the battery (van)

To gain access to the battery (**1**):

A - Unlock the battery support bracket by moving locks (**2**) to position (**a**).

B - Press control handle (**2**) and pull it downwards towards you.

C - Insert wheel wrench (**4**) in the battery support bracket and turn it through 1/4 or a turn to unlock the support bracket.

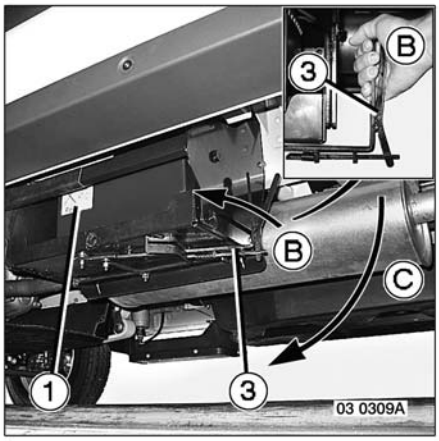


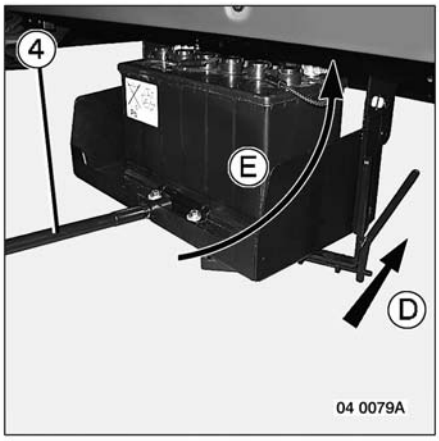
To put the battery support bracket back into place:

D - Push control handle (**3**) into its initial position.

E - Insert wheel wrench (**4**) into the battery support bracket and turn it through 1/4 of a turn to lock. Pull the wrench vigorously upwards while imparting motion towards the interior of the vehicle until the support bracket locks .

F - Free the two locks (**2**) by moving them to position (**b**).



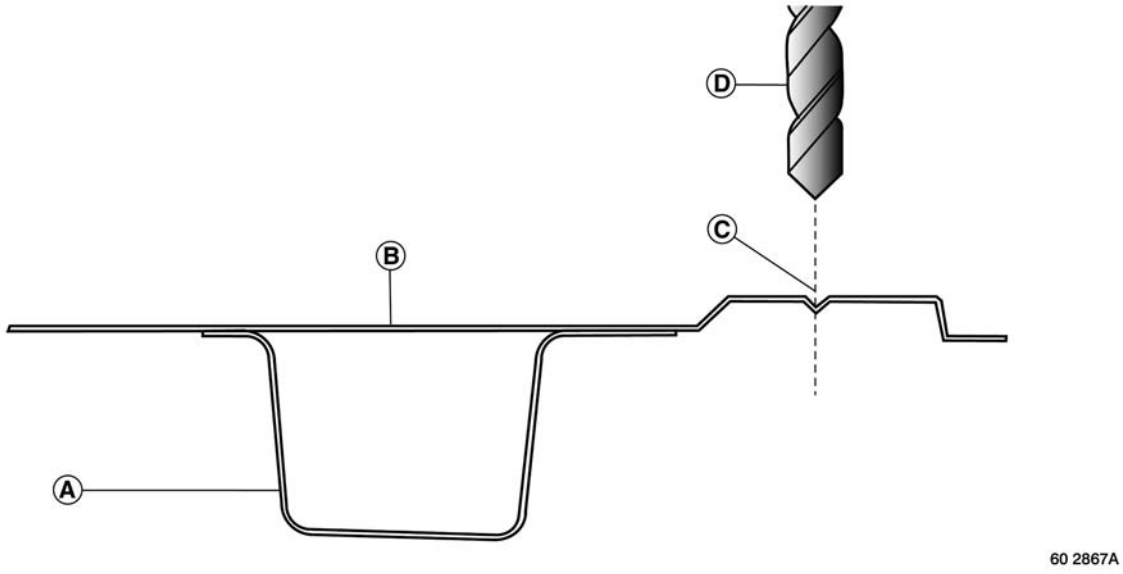


IMPORTANT
*Ensure that both locks (**2**) are correctly engaged. Locking pin (**5**) must be in contact with support bracket (**6**). If not, fully lower the battery support bracket and repeat operation "E".*

2.7 General drilling principles

2.7.1 Drilling cab panels for fitting accessories

This allows access to sealed crimping nuts for the assembly of accessories.
The recommendations below will help avoid damage to the roof headlining at the time of drilling.



A - Roof stiffener
B - Bodywork panel
C - Positions of impressions for drilling and access to crimp nut
D - Drill:
- dia. 9 mm for crimping nut dia. 6 mm

Details on crimping nuts and tools: see chapter “Addition of equipment to bodywork”.

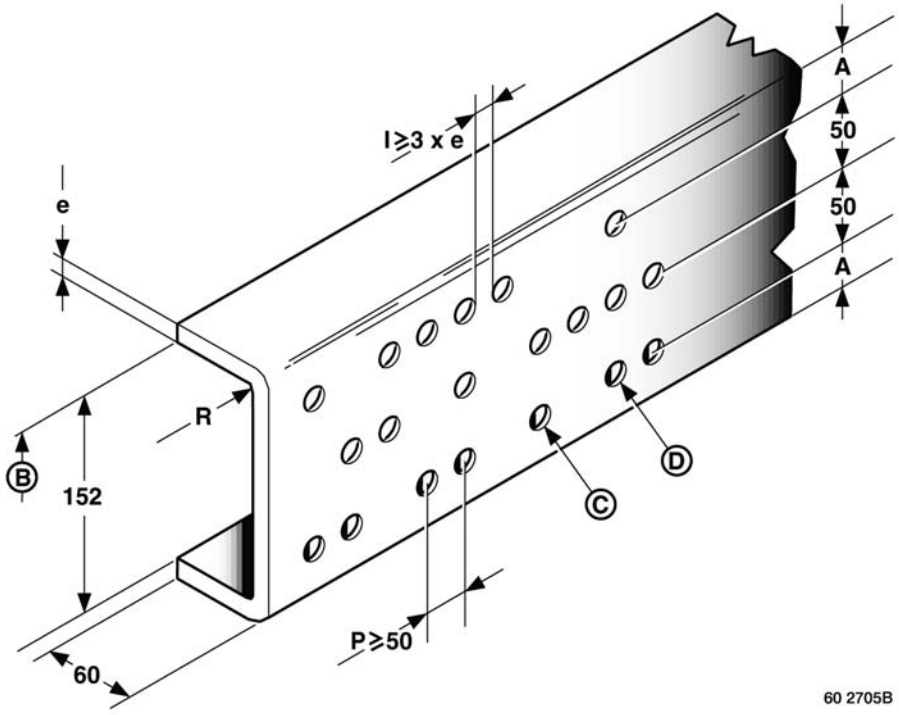
Anti-corrosion protection:

Deburr the holes after drilling.
Protect the metal with a zinc aerosol spray available from the Spare Parts Department, part N° 77 01 406 425.

2.7.2 Drilling in sidemembers

BANS

- No drilling in the flanges of sidemembers.
- No drilling more than 3 holes on the same vertical.



B - Chassis zero plane (RENAULT TRUCKS reference plane)
e - Thickness of sidemember (4 or 5 mm)
P - Between-centres distance between two drillings

All the drillings must be at a minimum distance from the sidemember flanges: A > R+3 mm + F
R - sidemember internal radius of curvature (11 mm)
F - diameter of washer or diameter of rivet head divided by two

For maximum safety, take a minimum value of 26 mm for dimension A.

C - Recommended drilling diameter: 11 mm
D - Alignment of 3 holes maximum on the same vertical axis
I – A minimum width corresponding to 3 times the thickness of the sidemember must be observed between 2 drillings

Anti-corrosion protection and paint retouches to the chassis
Deburr the holes after drilling.
Protect the metal with a zinc aerosol spray, part N° 77 01 406 425.
This product is available from the RENAULT TRUCKS Spare Parts Department.

2.8 Soundproofing screens and heat shields

2.8.1 Instructions for soundproofing screens

Soundproofing screens should neither be removed, modified nor displaced so as not to downgrade the vehicle sound level, which is covered by official homologation.

If it is unavoidable for them to have to be removed, they must without fail be put back into place when the work is completed.

After removal, only perfectly clean screens should be refitted.

The screens are to be cleaned using a cloth. If necessary, use soapy water (all other products are to be forbidden).

No solvents or paints are to be applied at all on either the inner or the outer faces of soundproofing screens.

Any damage to the internal protective film of the screen requires the screen to be replaced.

In the event of on-vehicle welding or the use of a sanding disk, provide efficient protection to the screens.
If the screens have been removed, provide efficient protection to the wiring harnesses.

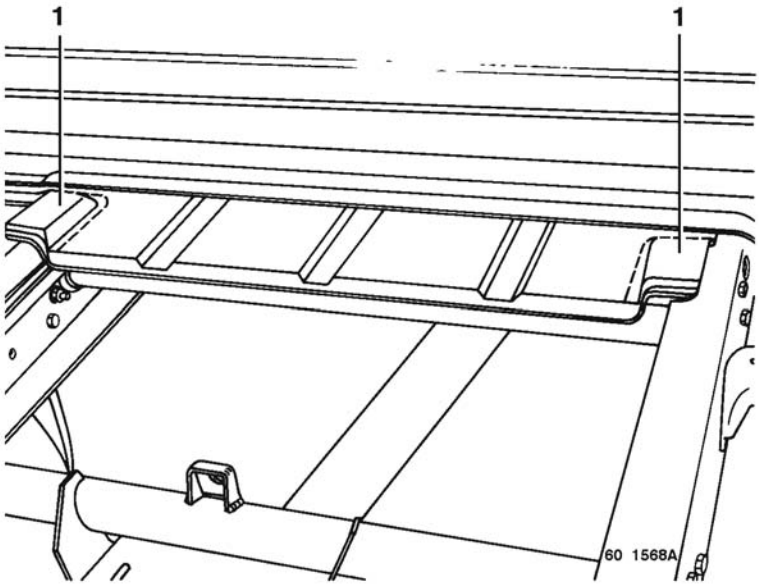
Pay particular attention that there are no inflammable products present on the screen protective films.

Overtightening of screen attaching nuts and bolts may lead to damage.
Observe the recommended tightening torques without fail.

- screen bracket / chassis fastenings: 20 Nm
- screen / chassis bracket fastenings: 8 Nm

2.8.2 Cab rear soundproofing screen

This screen is pre-cut to allow fitting of the sub-frame.
If need be, take off the 2 detachable parts (**1**).
No other modification is authorized on the screen.



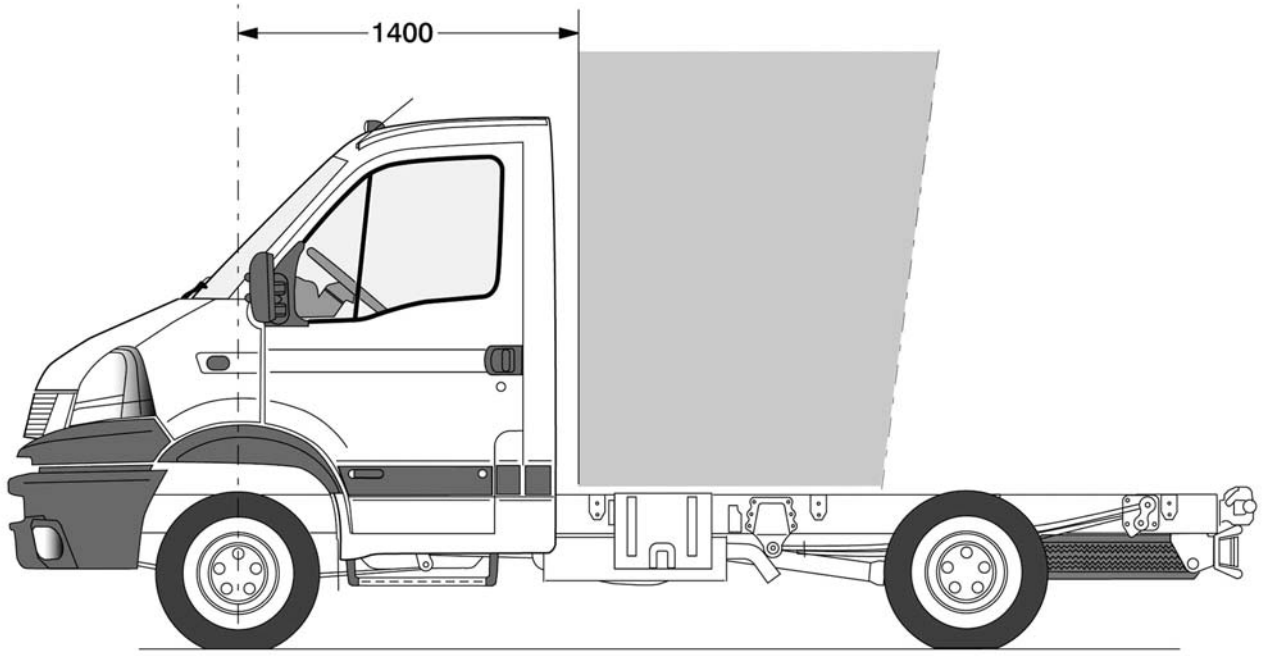
2.8.3 Instructions for heat shields

It is forbidden to remove or modify these shields. They play a part in the safety of your vehicle.
During chassis painting operations, take care to efficiently protect the hot face of heat shields against splashing paint and especially the shields surrounding the electric retarder.
In effect, these shields are only effective if the surfaces are free from any foreign matter.

3. INSTALLATION OF BODYWORK

3.1 Body start dimension

3.1.1 Single cab



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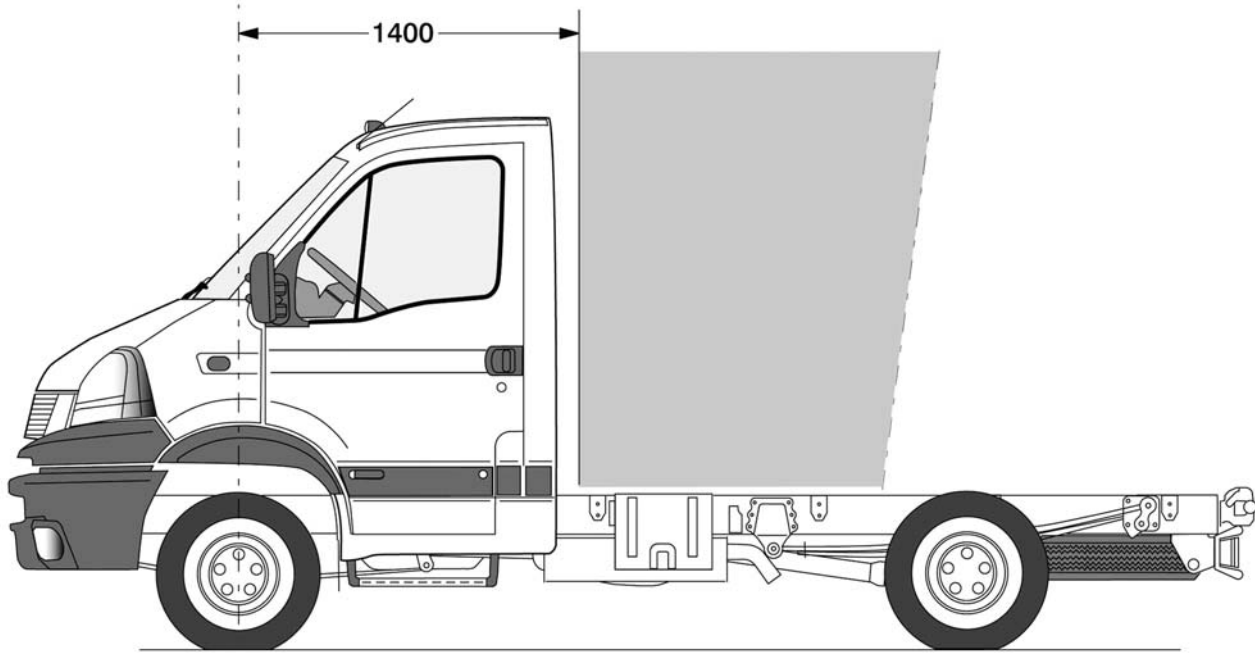
3.1.2 Double cab



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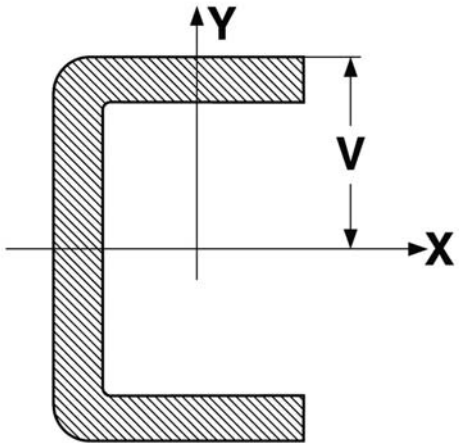
3.2 Sub-frame minimum inertia

GVW*	Min. sub-frame	Sub-frame minimum inertia (mm^4)
Up to 5 tonnes	80 x 40 x 3	430 000
More than 5 tonnes	100 x 50 x 4	1 100 000

* GVW = Plated Gross Vehicle Weight



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Reminder of formula for calculating maximum normal surface stress

$$\sigma = \frac{Mf}{\left(\frac{I}{v}\right)}$$

σ : maximum stress at surface edge (N/mm^2)
Mf : bending moment (Nm)
I : surface quadratic moment (mm^4)
v : distance between section extremity and neutral fibre (mm)

The sub-frame can be made of different steel sections, provided that its inertia remains the same for that of the sub-frame which is the minimum recommended.

3.3 Finishing of sub-frame start dimensions

Depending on:
- cab length (single cab, double cab),
- width of section making up the sub-frame.

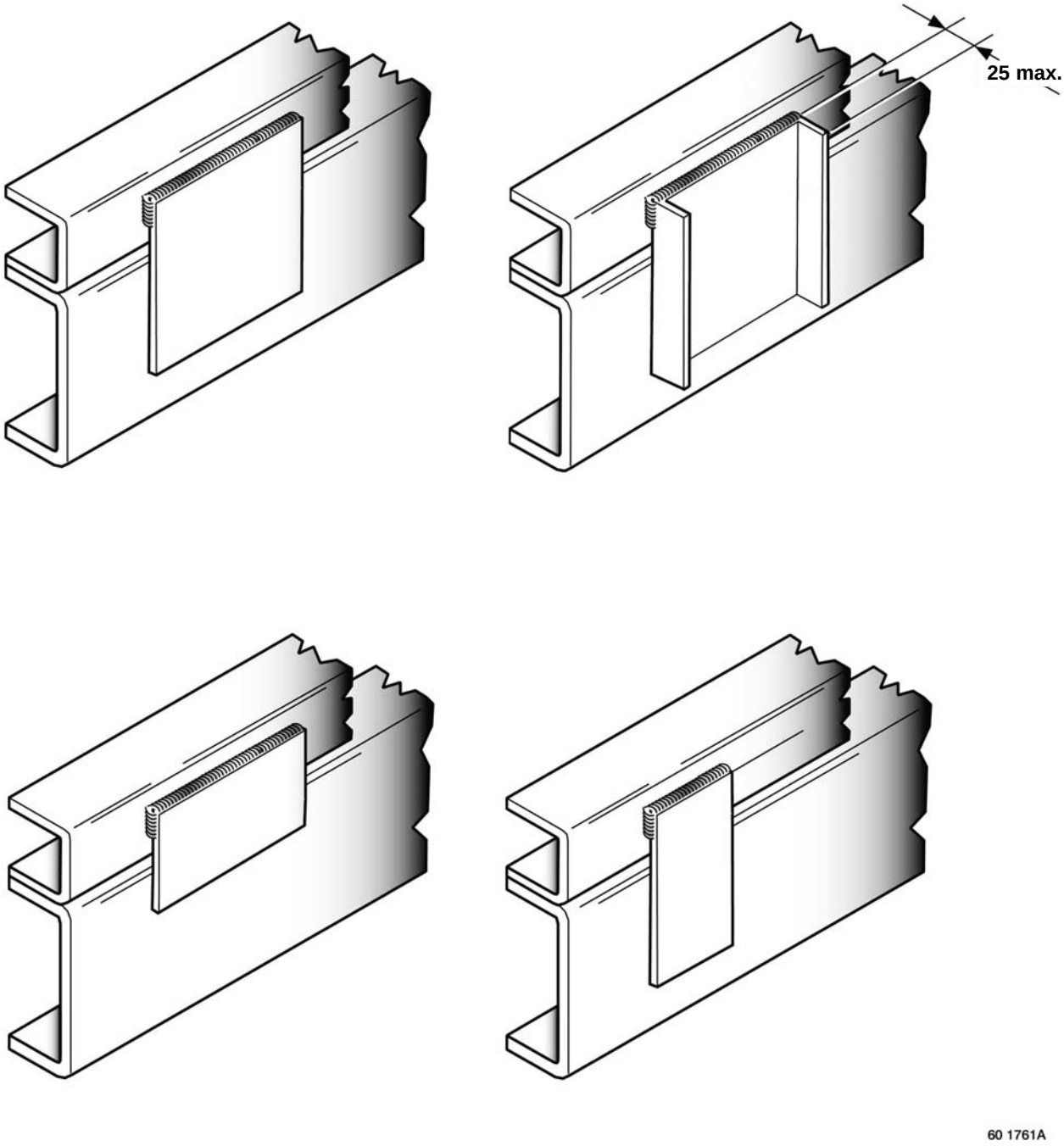
The finishing of the sub-frame must be:
- symmetrical,
- provided or not with horizontal cut-outs (reduction in width).

3.4 Lateral guiding

All bodies must be fitted with lateral guides to the front and rear of the sub-frame.

At the front:

Lateral guiding must be assured by 2 guide plates that are welded to the sub-frame.
It is forbidden to fasten the guide to the chassis on account of the risk of fracture.



At the rear:

Lateral guiding must be assured by 2 guide plates. These are drilled and screwed to the sidemembers - they also fulfil the function of inertia stop.

Observe the sidemember drilling recommendations described in the chapter “Drilling of sidemembers”.

IMPORTANT
Rear lateral guide plates must under no circumstances protrude past the rear end of the sidemember.

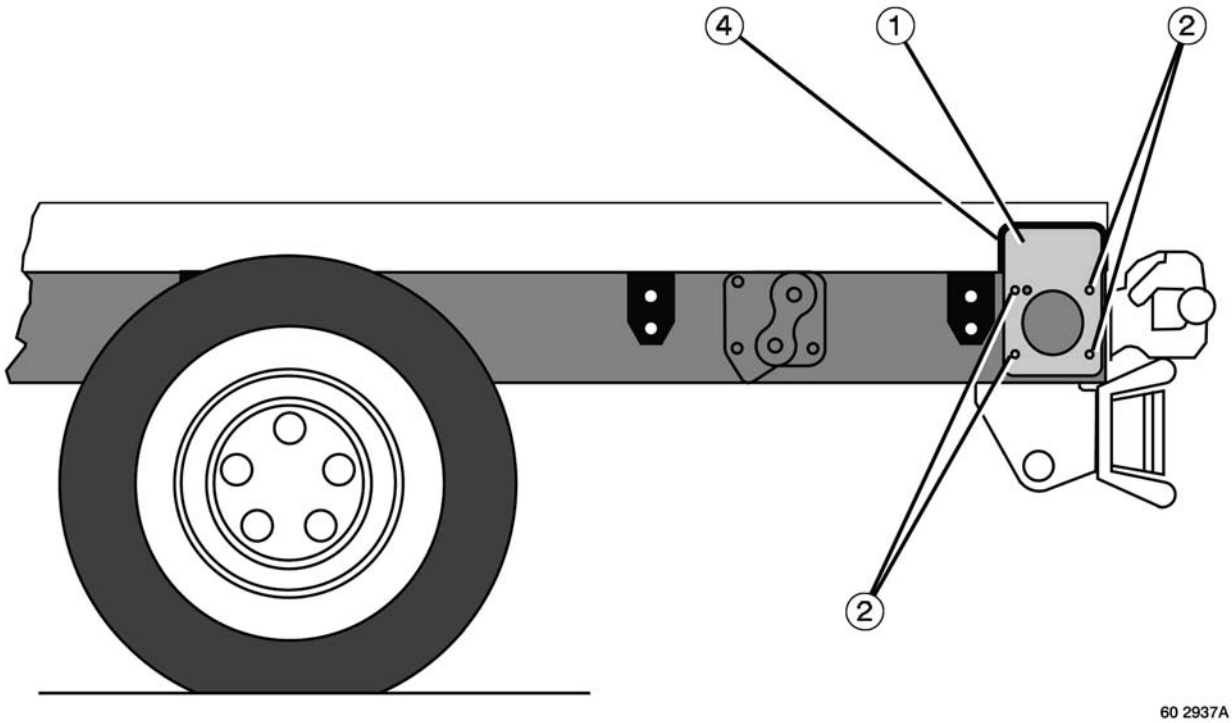
Assembly to the different wheelbases (except 3630 with rear overhang 845 mm)

- Screw on plate (**1**): part N° 50 10 621 366), using holes (**2**) corresponding to the fastening of the rear cross-member.
- Weld plate (**1**) to the sub-frame at (**4**).

Fastening:

- 8 hexagon bolts M10 x 125 x 40 class 10.9
- 8 plain washers 10 x 27 x 3
- 8 DRH flanged locknuts M10 x 125 class 10

For threaded hardware, see chapter "Threaded hardware and tightening torques for steel or cast-iron parts".
The use of nuts with nylon ring (e.g. Nyloc) is forbidden.



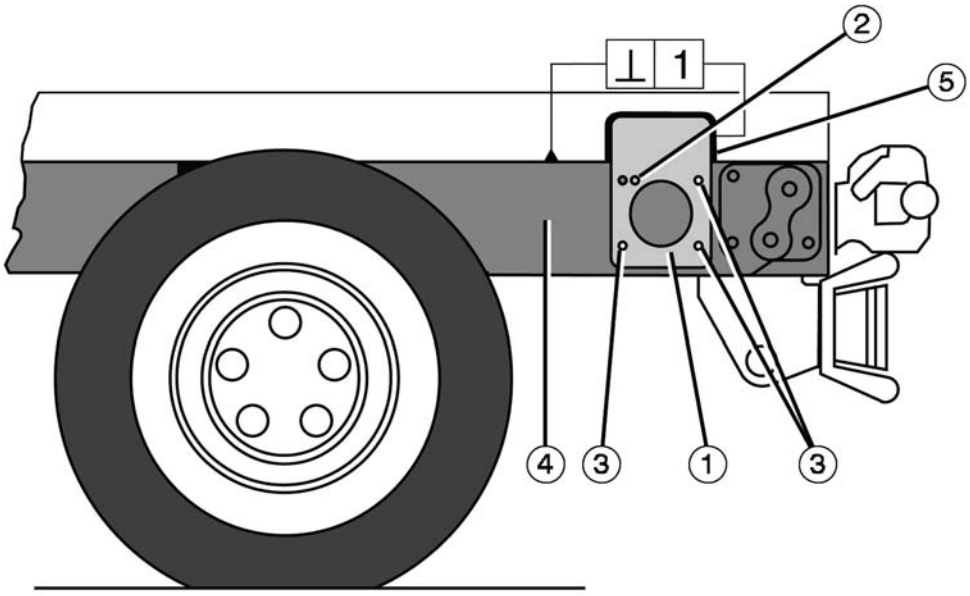
Assembly to wheelbase 3630 with rear overhang 845 mm:

- Screw on plate (**1**): (part N° 50 10 621 366), using holes (**2**) corresponding to the fastening of the last body bracket (top hole).
- Watch that plate (**1**) is perpendicular in relation to the chassis (**4**).
- Screw up at (**2**) first (nut inside the chassis).
- Counter-drill sidemember (**4**) at (**3**), using plate (**1**) as guide.
- Screw up at (**3**) (nuts inside the chassis).
- Weld plate (**1**) to the sub-frame at (**5**).

Fastening:

- 8 hexagon bolts M10 x 125 x 40 class 10.9
- 8 plain washers 10 x 27 x 3
- 8 DRH flanged locknuts M10 x 125 class 10

For threaded hardware, see chapter "Threaded hardware and tightening torques for steel or cast-iron parts".
The use of nuts with nylon ring (e.g. Nyloc) is forbidden.



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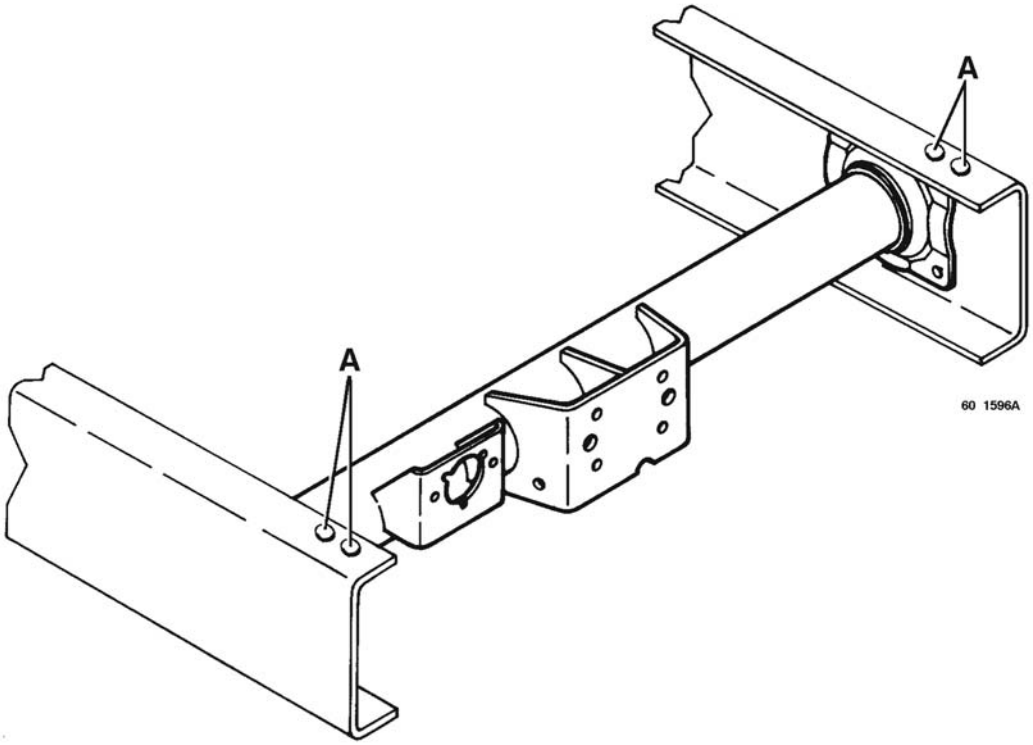
3.5 Inertia stops

All bodies or equipment must be fitted with an inertia stop to the rear of each sidemember to retain the body against motion.
This can be achieved by:
- fastening the sub-frame to the chassis with dia. 10 mm nuts and bolts crossing pre-arranged drillings (A) located on the upper flanges at the rear end of the sidemembers.
- screwing of lateral guide plates by two dia. 10 mm nuts and bolts (see “Lateral guiding” chapter). Observe the recommendations described in the “Drilling in sidemembers” chapter.



Fastening the sub-frame at A:
- 4 hexagon bolts M10 x 125 class 10.9
- 8 DRH flanged locknuts M10 x 125 class 10
- 8 washers 10 x 22 x 3

For threaded hardware, see chapter "Threaded hardware and tightening torques for steel or cast-iron parts".
The use of nuts with nylon ring (e.g. Nyloc) is forbidden.

NOTE
The flanks of the tailgate may serve as inertia stops.

3.6 Attachment of bodywork

It is essential to comply with the stipulations hereafter for attaching bodywork of equipment to our vehicles.

For special cases, contact the RENAULT TRUCKS Product Application Department.

The bodywork must be correctly attached so that both the static and dynamic stresses are freely transmitted without causing excessive local strain, which could prejudice the reliability of the chassis frame or affect the road behaviour of the vehicle.

The use of brackets mounted in production to the chassis is compulsory.

The fastening of body sub-frames or undercarriages must be carried out according to the recommendations defined in this document (consult the “Bodywork fastening type” chapter).

Sub-frames or undercarriages must be continuous and fit perfectly over the entire length of the chassis. They may however be intermittent for a few specific applications (e.g. tankers). In such case, their attachment remains entirely under the bodybuilder’s responsibility.

Sub-frames or underbodies should always be continuous and marry the entire length of the chassis. They may however be discontinuous for some specific applications (e.g. tankers) - in such case, their execution is under the full responsibility of the bodybuilder.

Protection against exhaust heat radiation: the closeness of the bodywork to the exhaust pipe and the fitting of certain accessories (electric retarder, etc...) may require the installation of a suitable heat shield by the bodybuilder.

BANS

WE FORBID:

- Attachment of sub-frames by U-bolts, clamps or equivalent systems.
- Use, drilling or welding of spring hangers.
- Any modification to: chassis, driveline, suspension (except if contained in the Guide for Fitting Bodywork).
- Attachment of sub-frames to sidemembers by welding.
- Drilling of stiffener gussets.
- Welding, notching of sidemembers, gussets or cross-members.
- Use or modification of our nut and bolt hardware for the attachment of a body or a sub-frame (except for special cases specified in this document).
- Dismantling of brackets attached to the chassis (unless specified otherwise in this document).
- Insertion of wooden blocks between sub-frames and the chassis.
- Modification to type approved regulatory installations (run-under guard, etc...).

3.7 Attachment of sub-frames to brackets

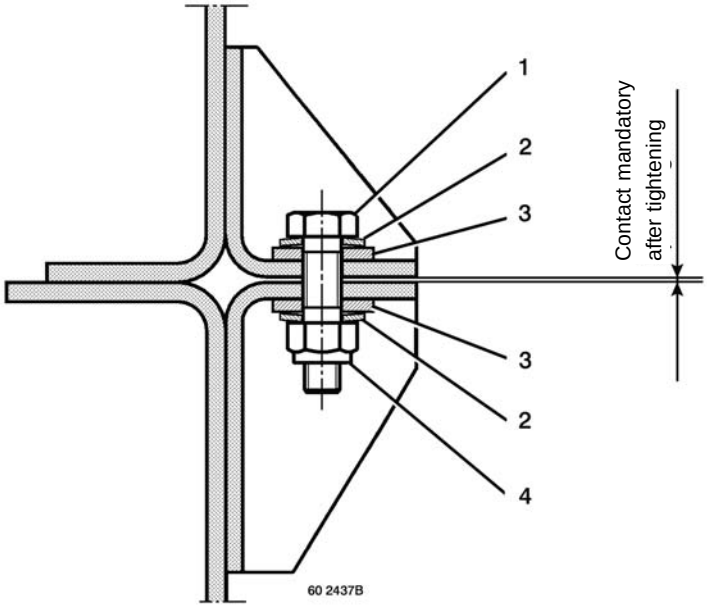
- The use of brackets mounted in production on the chassis is compulsory.

- Sub-frames or underbodies must mandatorily be fastened by rigid attachments.

IMPORTANT
Contrary to other vehicle series of our make, on the RENAULT MASCOTT the first bracket must be fitted by means of a rigid attachment, without fail.

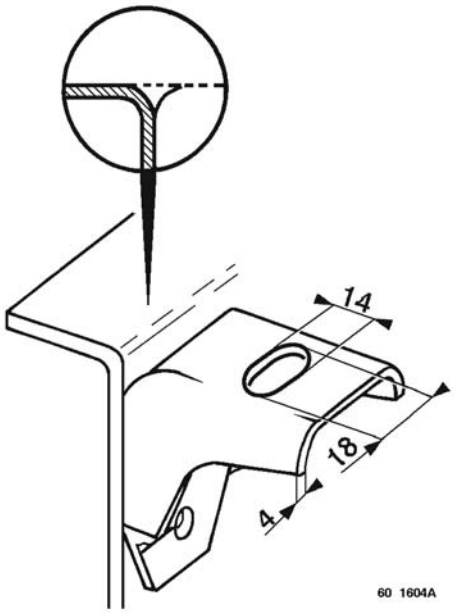
Rigid attachment
1 - Hexagon bolt M 12 x 125 x 50, class 10.9
2 - 2 taper washers 12 x 30 x 3.2
3 - 2 plain washers 12 x 32 x 2.5
4 - Nut DRH M12 class 10
or other locknut except nut with nylon ring (e.g. Nyloc)

IMPORTANT
Min. clearance 1 to 2 mm before tightening.



Tightening torque : 110 Nm.

The brackets are flush with the sidemembers.



Hardware kit

Use the “Threaded hardware kit for fastening sub-frames to brackets” part N° 50 01 849 606.

3.8 Longitudinal positioning of brackets on chassis

3.8.1 Single cab

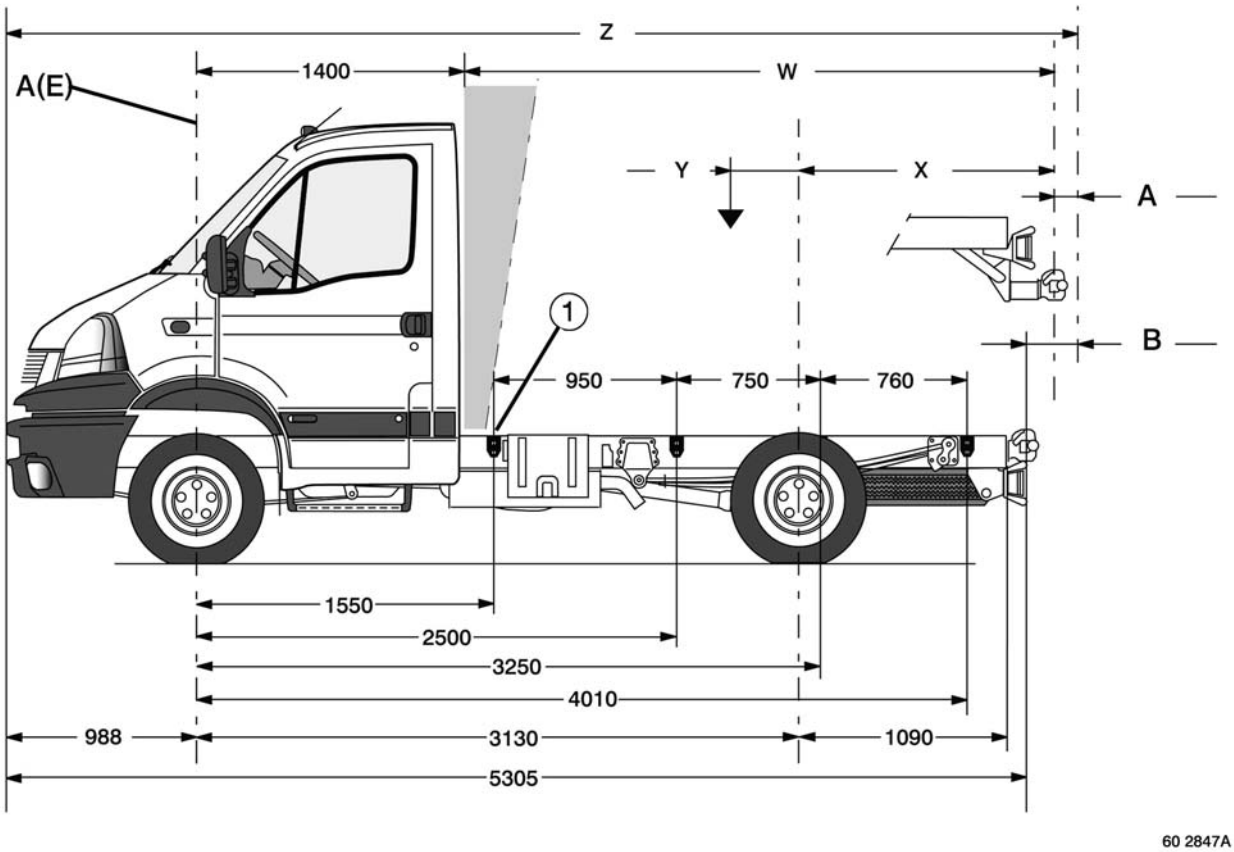
A (E) - front axle centre-line

A – 120 mm (for fittings)
B – 280 mm (max.)

The values of dimensions X, Y, Z and W are given in the 1:20th scale bodywork drawing.

NOTE
The bracket (**1**) is the first bracket to the rear of the cab. The brackets located under the cab are not taken into account (case of double cabs).

To obtain precise information, refer to the 1/20th scale drawings, calculation sheets or type approval department reports to be found on the website “www.renault-trucks.com“ under RENAULT MASCOTT.
For special cases, contact the RENAULT TRUCKS Product Applications Department.



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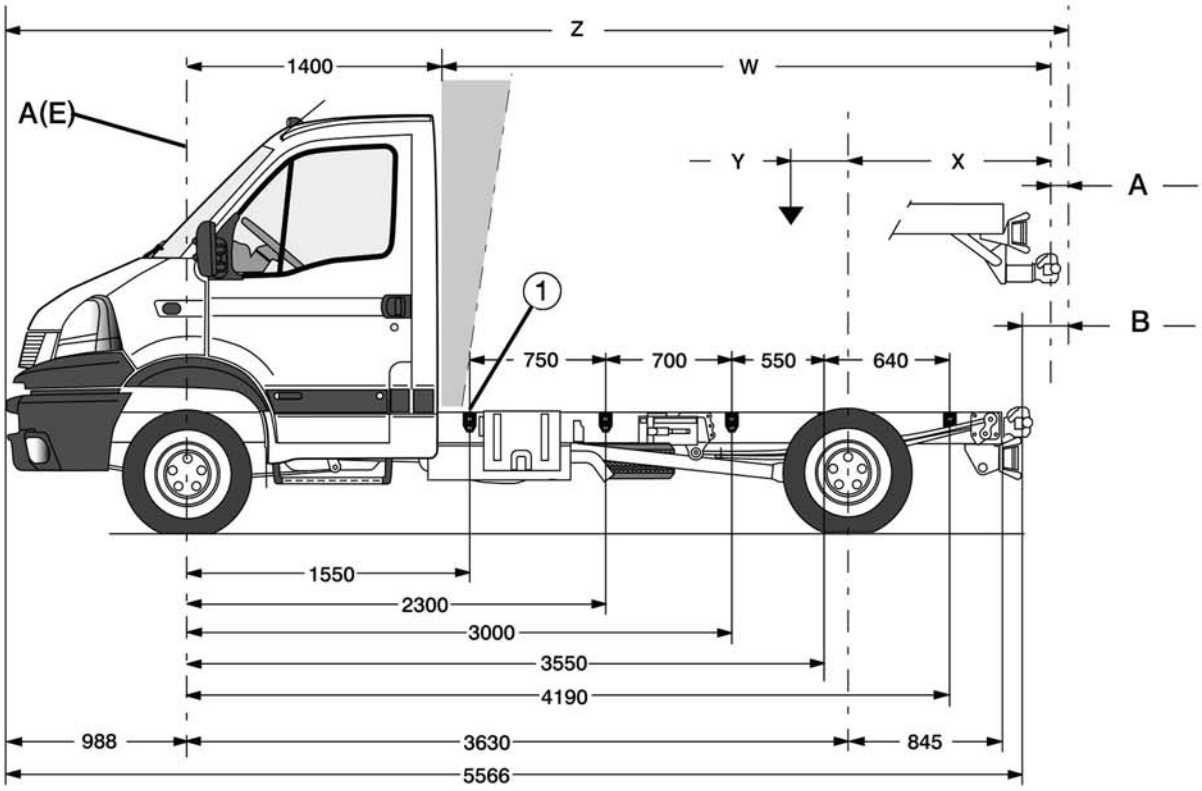

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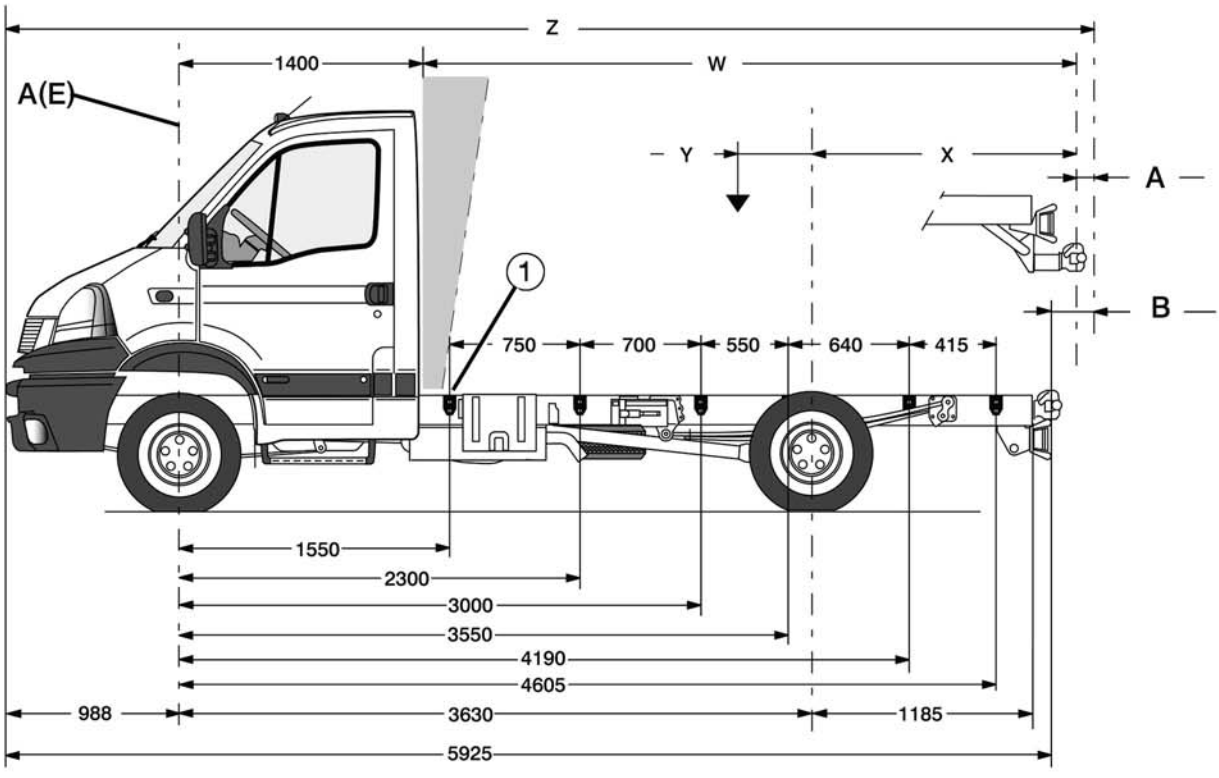

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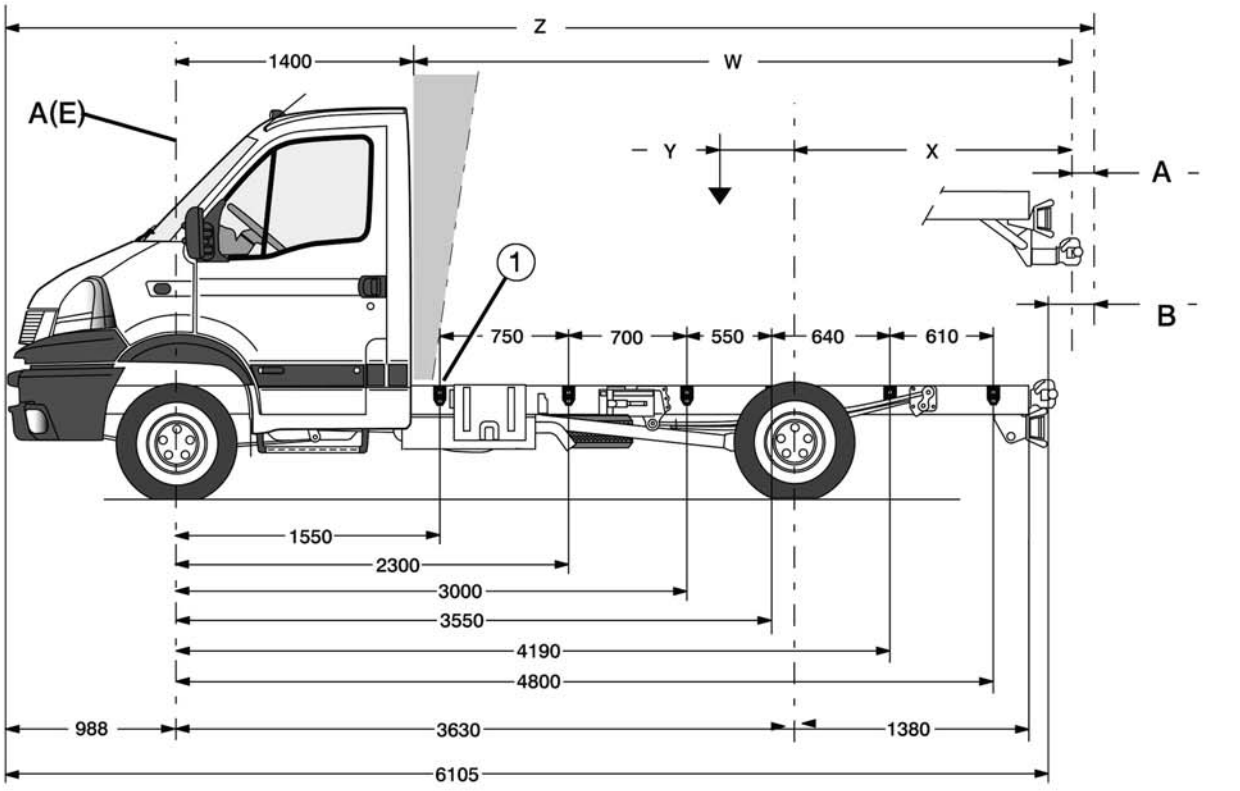

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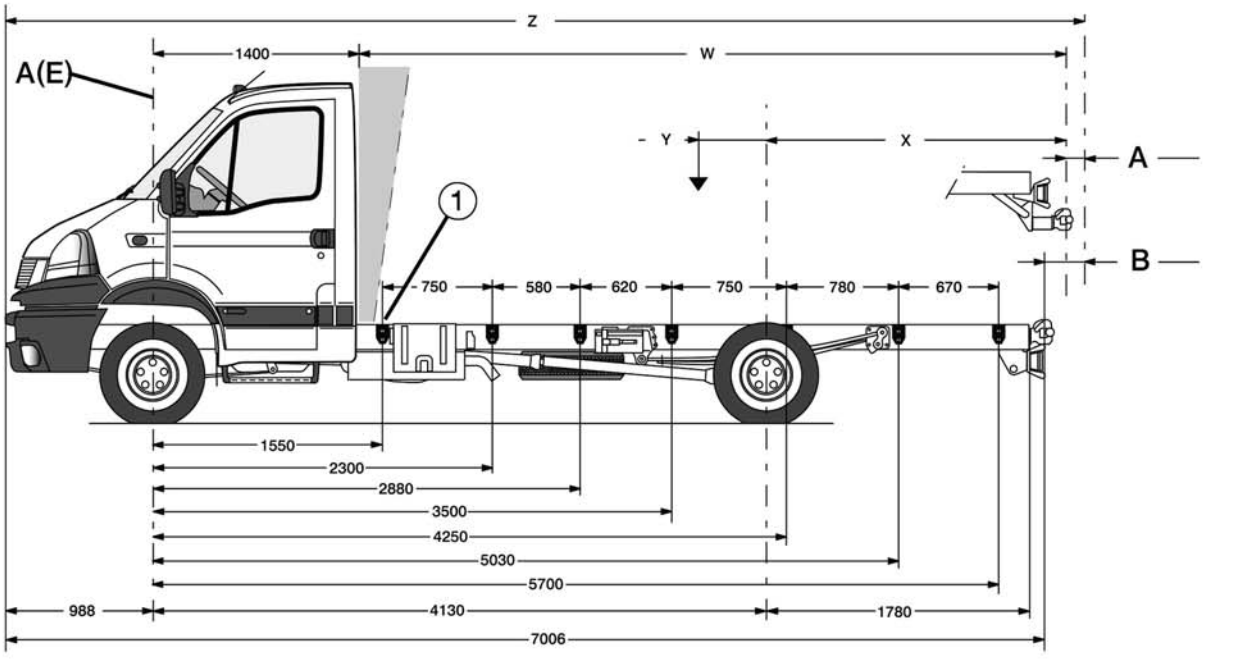

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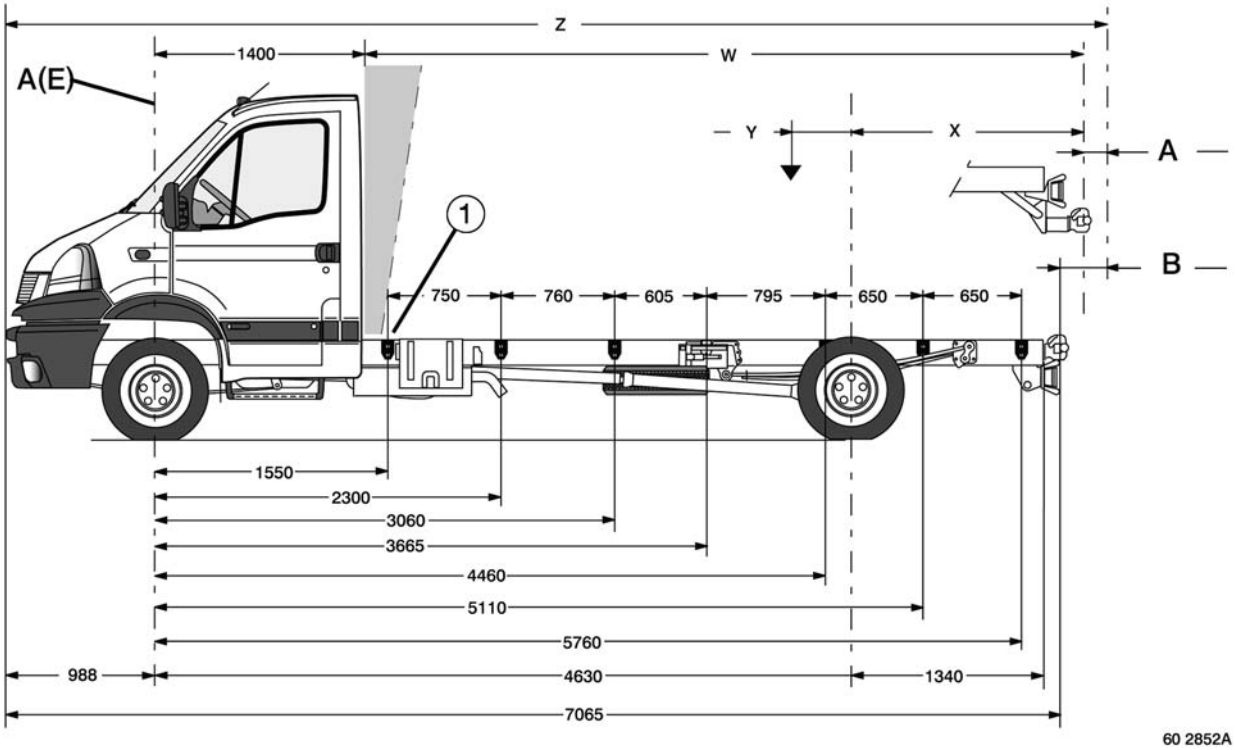
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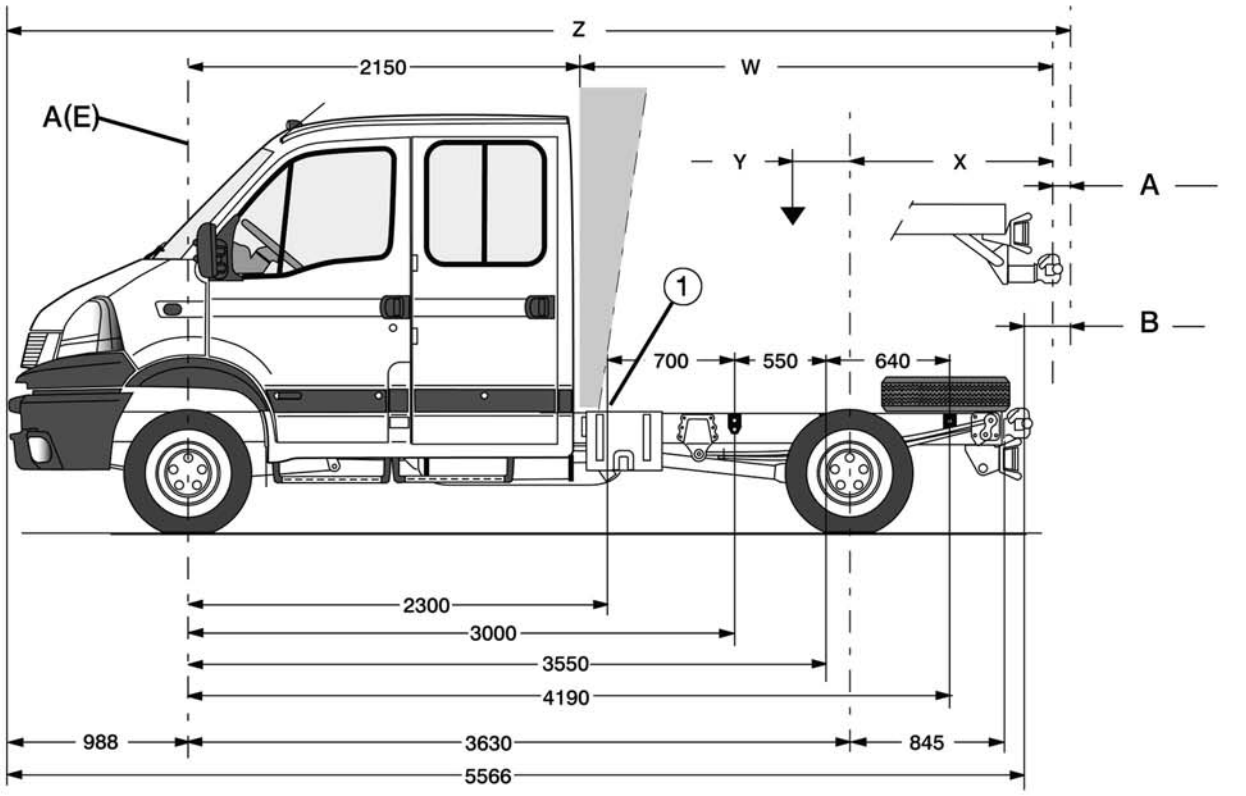
3.8.2 Double cab



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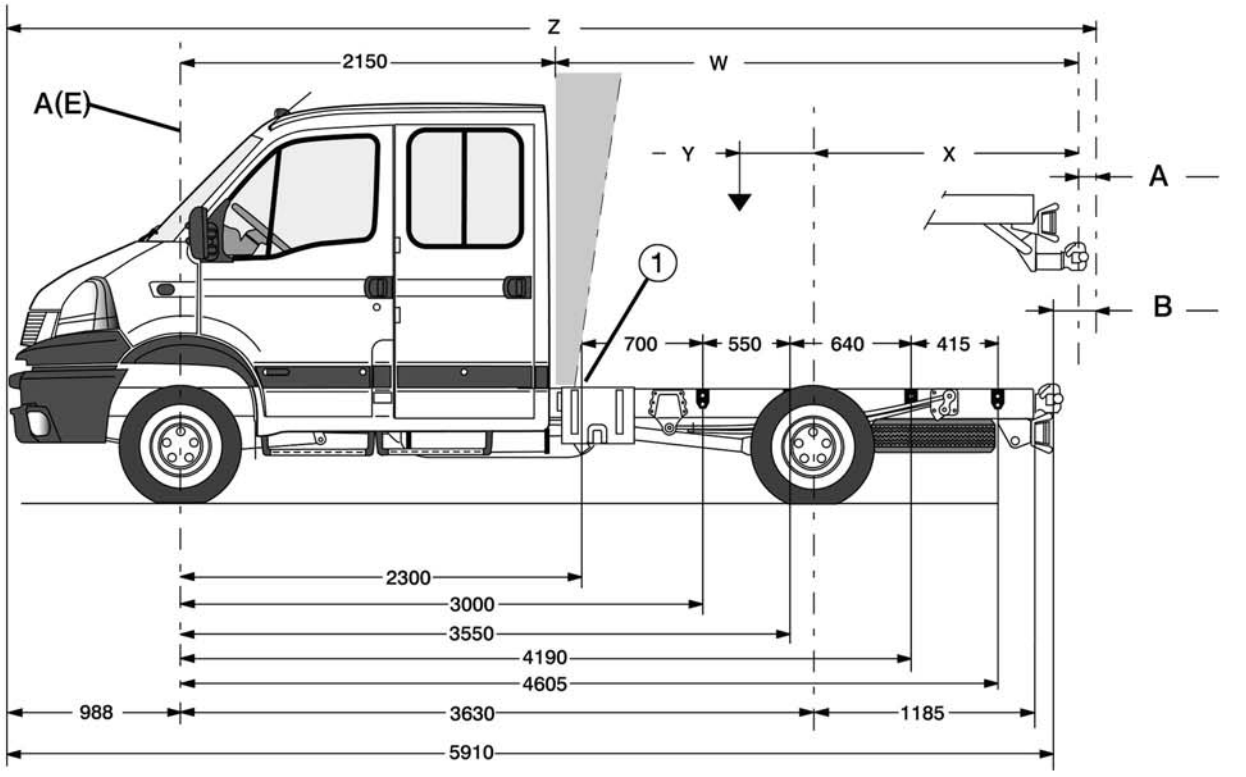

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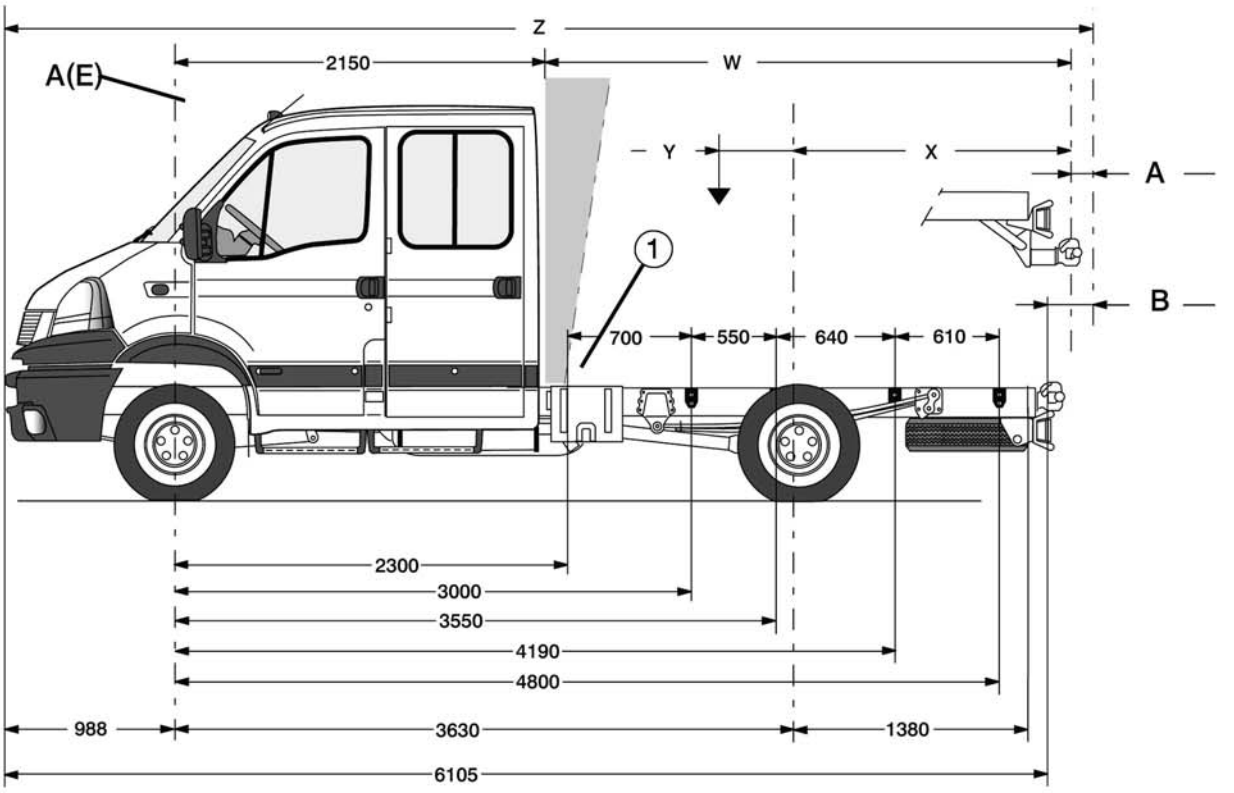

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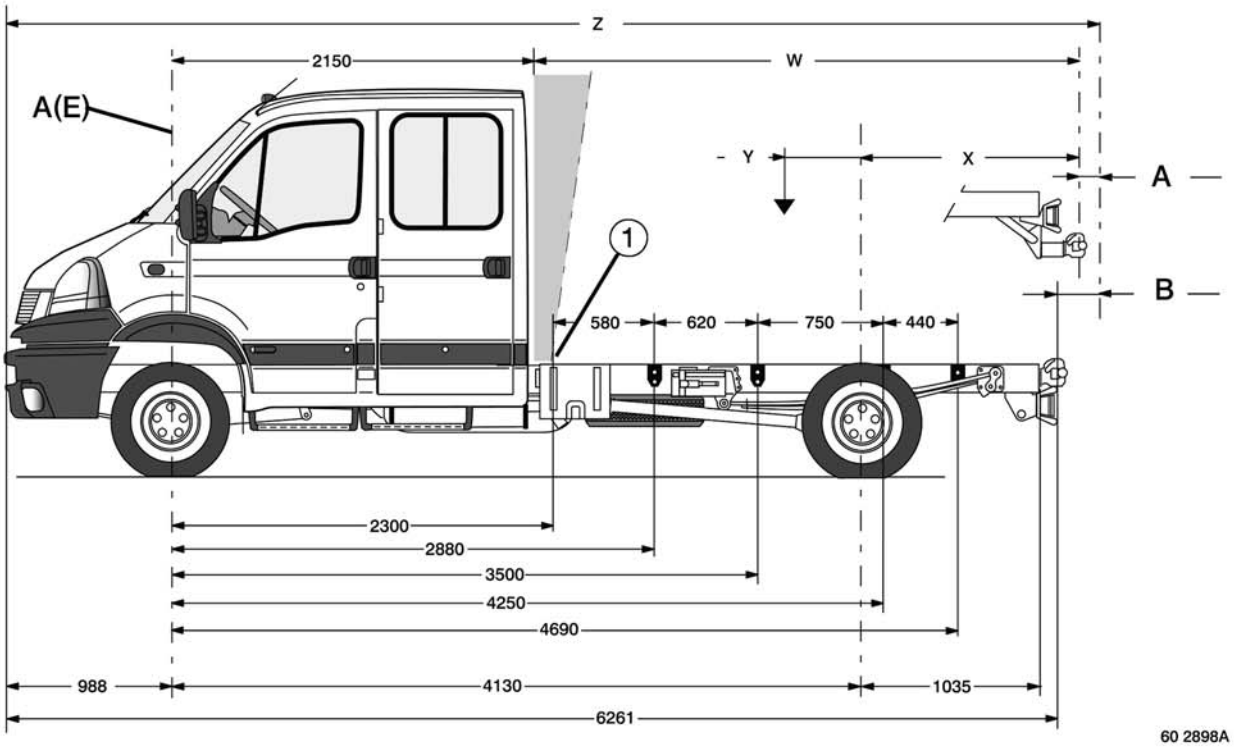

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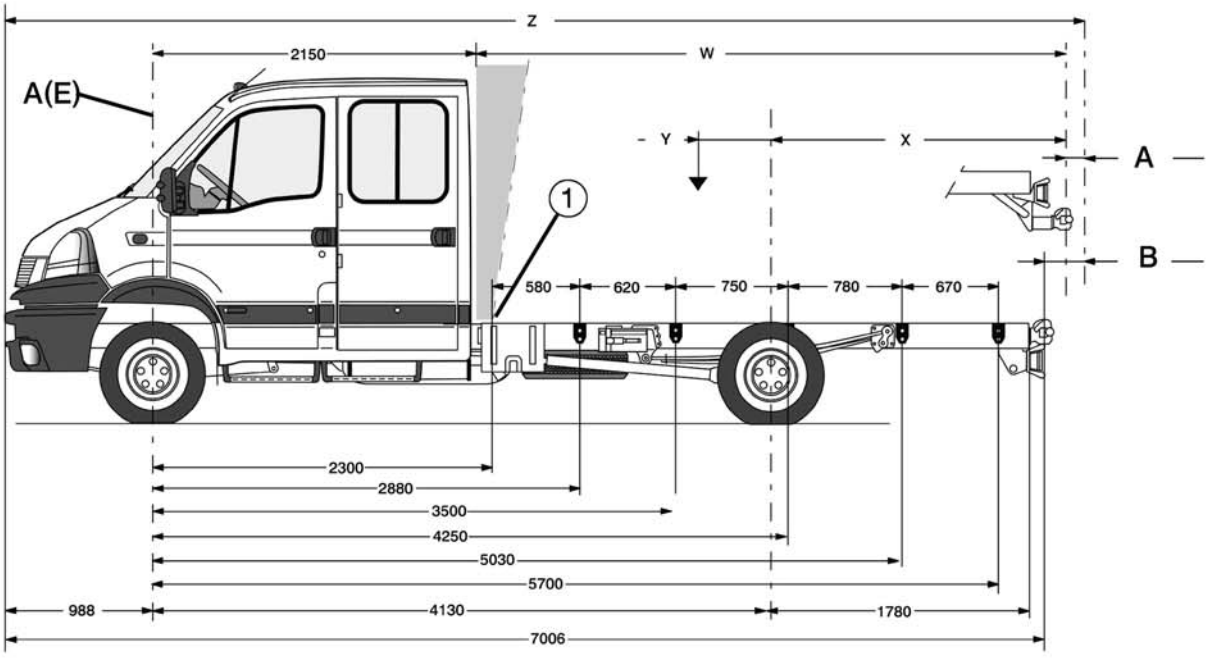

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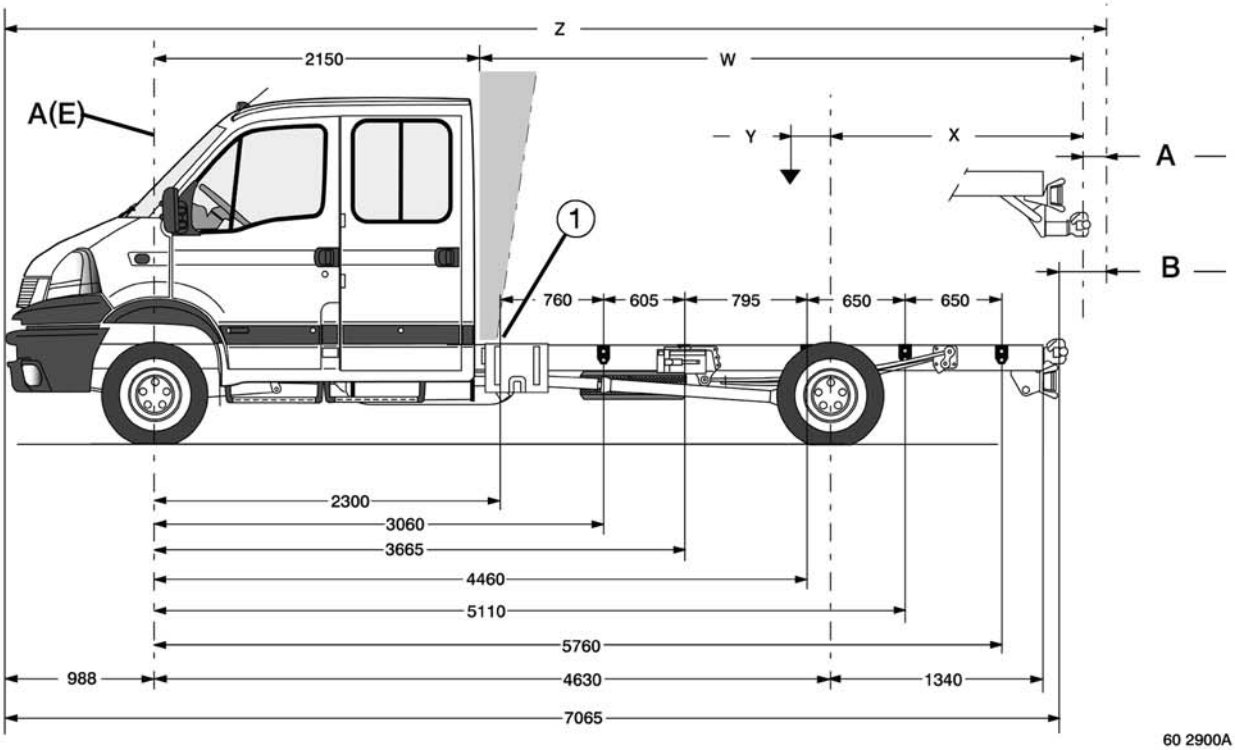

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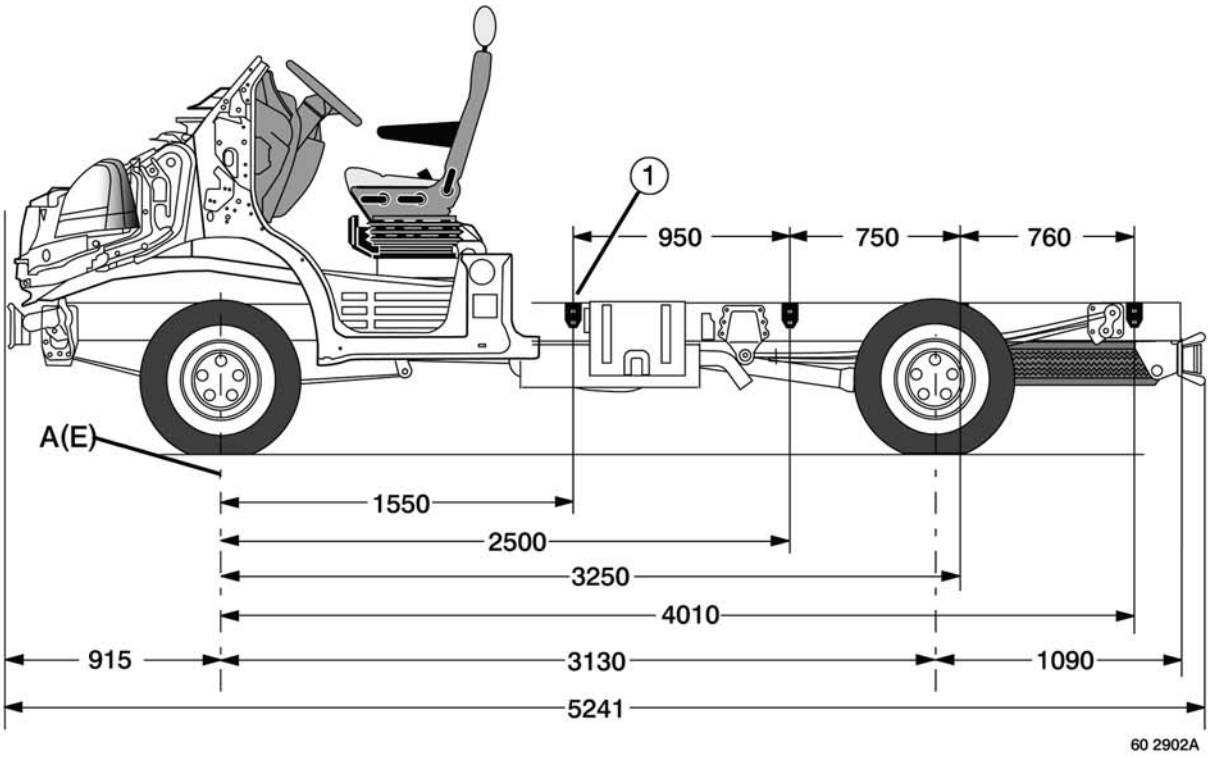
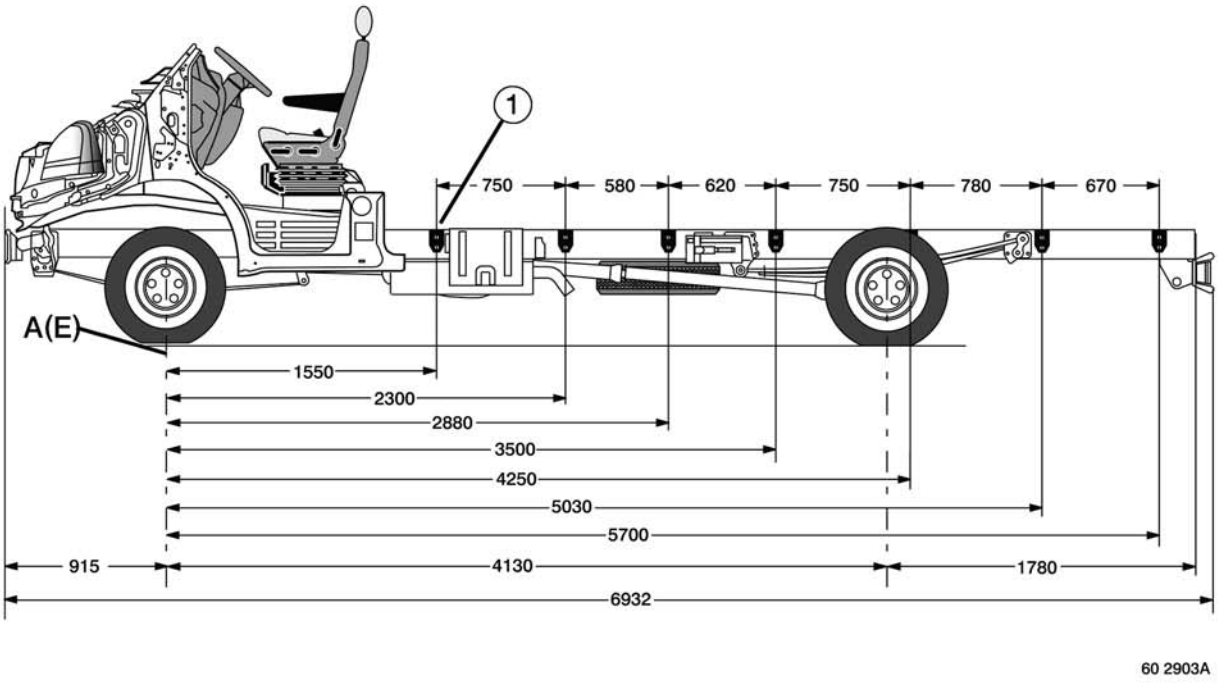
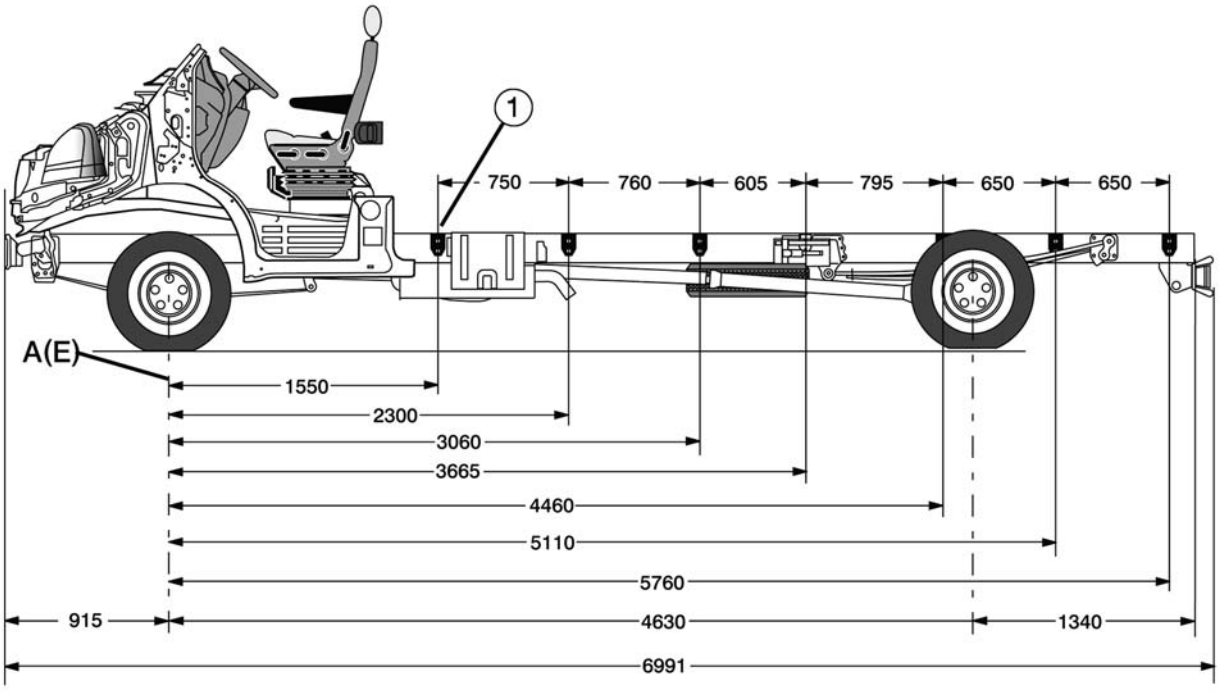
3.8.3 Chassis cowl



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4. BEHIND-CAB HANDLING CRANES

4.1 Crane maximum lifting capacity

GVW (kg)	Lifting couple (tonne.metre)
3 500	3
5 000 / 5 500 / 6 000	4.5
6 500	5

4.2 Sub-frame specific to cranes

The assembly of a crane to the chassis behind the cab requires the fitting of a specific sub-frame.

The sub-frame must be in one single piece, starting from the rear of the cab and going as far as the rear end of the overhang. Its front end must be degressive in form (see “Finishing of sub-frames behind the cab” section). The sub-frame must be of a section with minimal inertia: 1 100 000 mm^4 (see "sub-frame section" chapter).

When the crane is mounted with another moving equipment item, they must be mounted on one single sub-frame whose module of inertia is to be calculated as a function of the equipment placing most stress on the sidemembers. If necessary, weld a reinforcement in the support zone of the crane.

4.3 Assembly of stiffener plates to sidemember

IMPORTANT
These stiffener plates can also be used for harsh usage on refuse collectors.

On single cab

Preparation of chassis	Left sidemember				Right sidemember			
	3130	3630	4130	4630	3130	3630	4130	4630
Replace first bracket rivets D10 with: - Hexagon bolts M10x125x30 class 10.9 - Washers 10x27x3 - Flanged nuts DRH M10x125 class 10	X	X	X	X	X	X	X	X
Replace cross-member top rivet D10 with: - Hexagon bolt M10x125x30 class 10.9 - Washer 10x27x3 - Flanged nut DRH M10x125 class 10	X	X	-	-	X	X	-	-
Replace 4 battery tray welded studs M10x125x30 with studs length 35.	X	X	X	X	-	-	-	-
Number of drillings to be added on the sidemember	14	10	13	13	17	13	16	16

Assembly of stiffener plate to chassis	Left sidemember				Right sidemember			
	3130	3630	4130	4630	3130	3630	4130	4630
Remove wiring harness support	X	X	X	X	-	-	-	-
Remove fuel tank	-	-	-	-	X	X	X	X
Remove first bracket	X	X	X	X	X	X	X	X
Remove battery tray	X	X	X	X	-	-	-	-
Attach stiffener plate to first bracket fastenings	X	X	X	X	X	X	X	X
Insert hexagon bolts in cross-member	X	X	-	-	X	X	-	-
Install washers	X	X	-	-	X	X	-	-
Screw up flanged nuts	X	X	-	-	X	X	-	-
Insert hexagon bolts in cross-member (quantity)	15	15	18	18	18	18	21	21
Install washers (quantity)	15	15	18	18	18	18	21	21
Screw up flanged nuts (quantity)	15	15	18	18	18	18	21	21
Refit wiring harness support	X	X	-	-	-	-	-	-
Refit battery tray	X	X	X	X	-	-	-	-
Refit first bracket, if necessary	X	X	X	X	X	X	X	X
Refit fuel tank	-	-	-	-	X	X	X	X

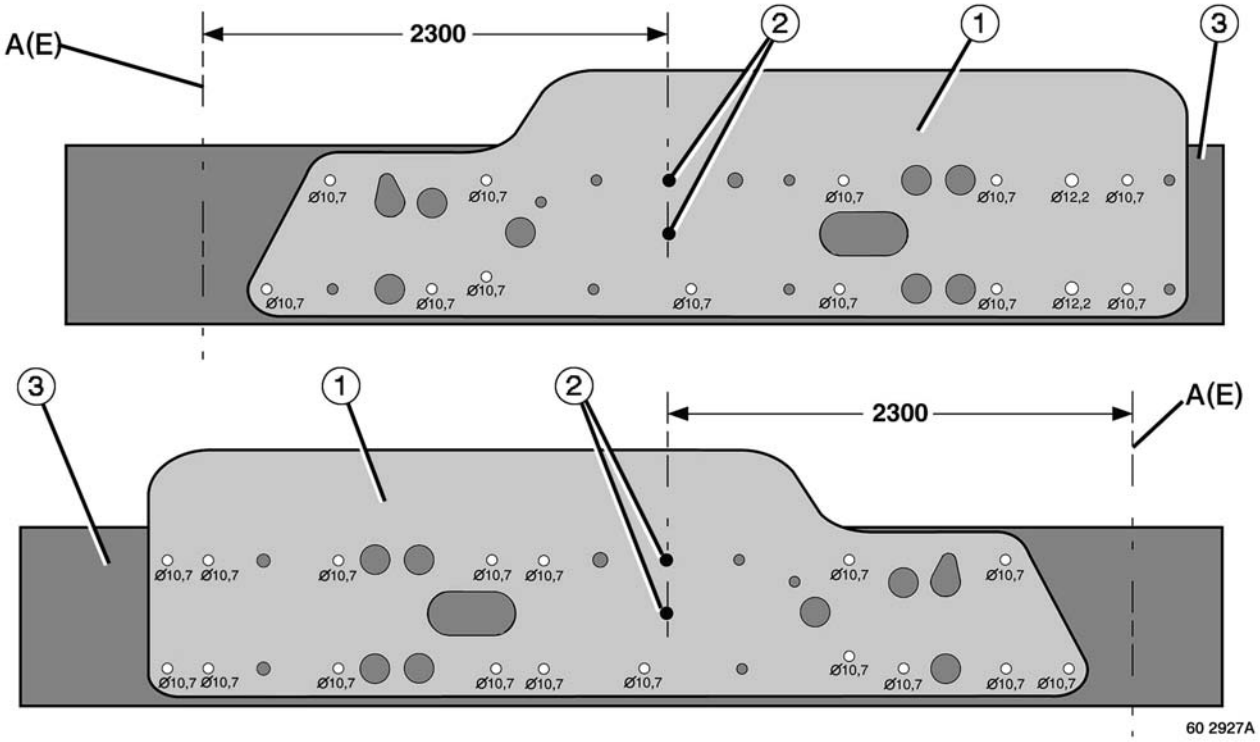
A (E) front axle centre-line
1 – Stiffener plate (part N° 50 10 580 556)
2 – 2 holes corresponding to fastening of the first bracket
3 – Sidemember

Single cab

Assembly of stiffener plate for wheelbase 3130 mm (left-hand and right-hand sidemember)

14 holes (white circles) to be counter-drilled in left-hand sidemembers.

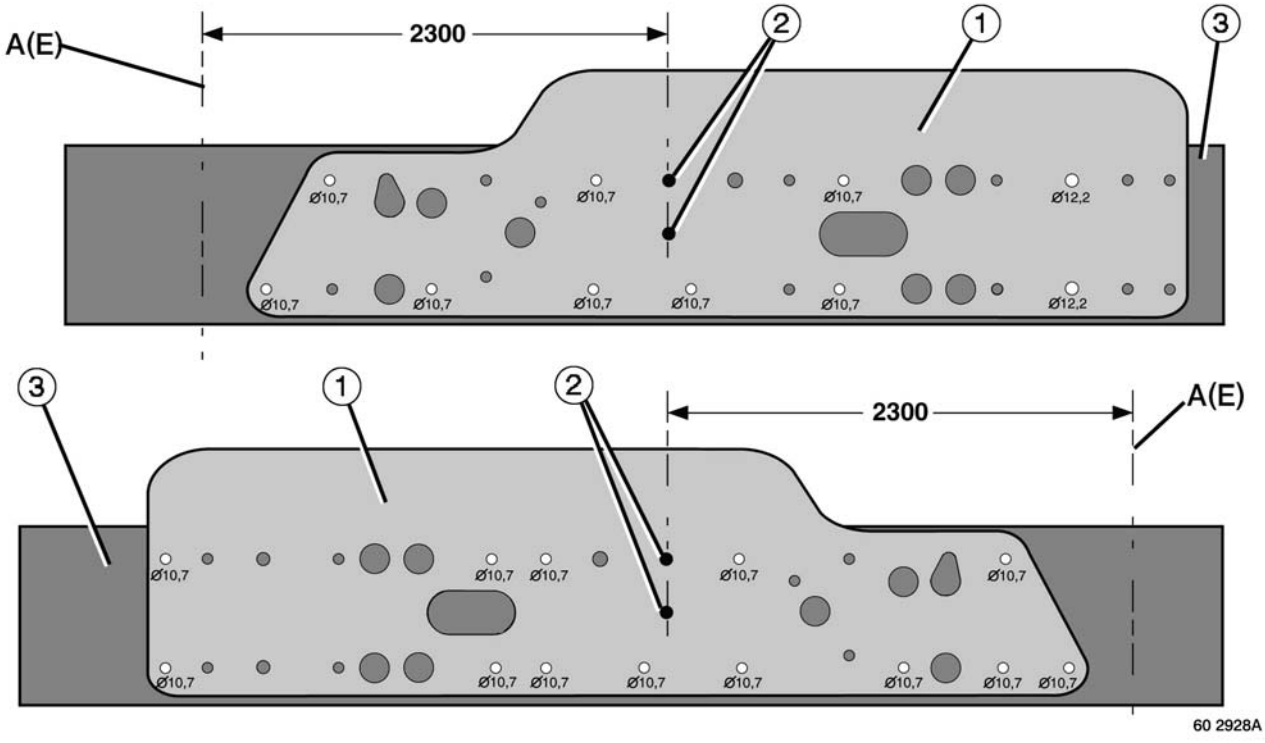
17 holes (white circles) to be counter-drilled in right-hand sidemembers.



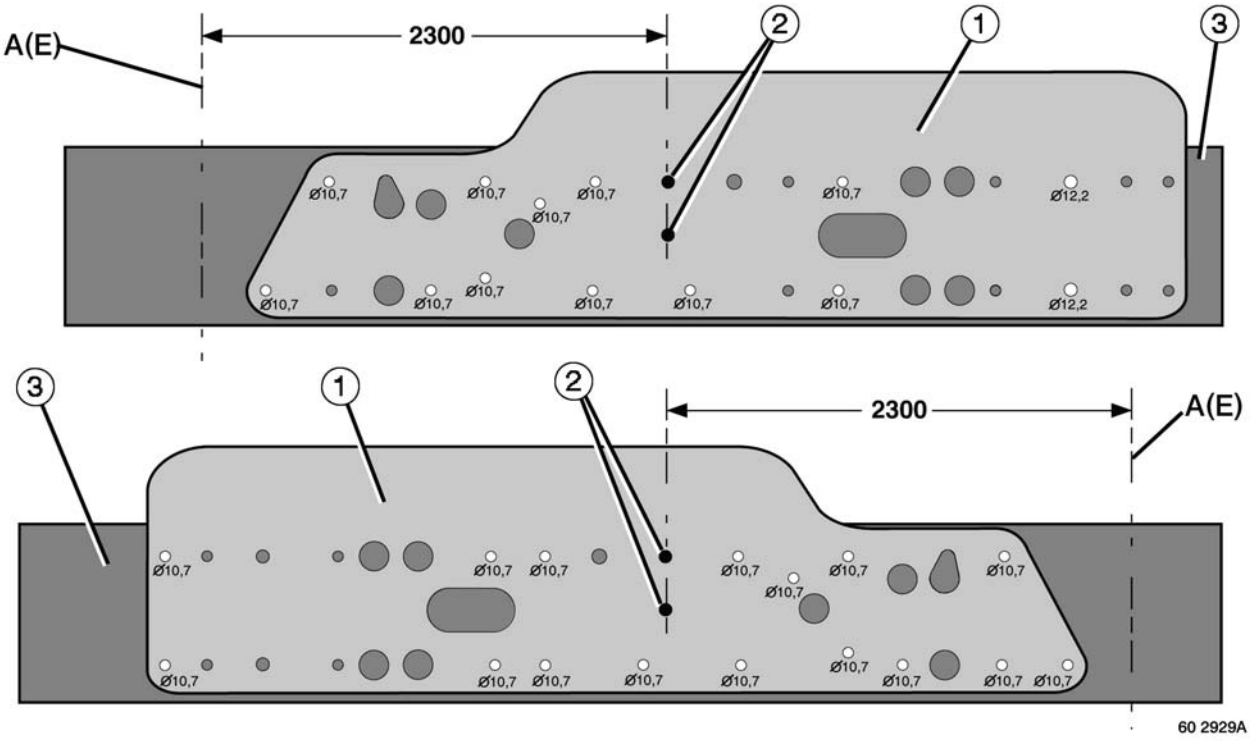
Assembly of stiffener plate for wheelbase 3630 mm (left-hand and right-hand sidemember)

10 holes (white circles) to be counter-drilled in left-hand sidemembers.

13 holes (white circles) to be counter-drilled in right-hand sidemembers.



Assembly of stiffener plate for wheelbases 4130 and 4630 mm (left-hand and right-hand sidemember)
13. holes (white circles) to be counter-drilled in left-hand sidemembers.
16 holes (white circles) to be counter-drilled in right-hand sidemembers.



On double cab

Preparation of chassis	Left sidemember			Right sidemember		
	3630	4130	4630	3630	4130	4630
Replace first bracket rivets D10 with: - Hexagon bolts M10x125x30 class 10.9 - Washers 10x27x3 - Flanged nuts DRH M10x125 class 10	X	X	X	X	X	X
Number of drillings to be added on the sidemember	6	5	5	9	10	10
One of the sidemember drillings corresponds to a braking system clip and its position is to be moved towards the front of the vehicle (Ox-15 mm)	-	-	-	-	X	X

Assembly of stiffener plate to chassis	Left sidemember			Right sidemember		
	3630	4130	4630	3630	4130	4630
Remove fuel tank	-	-	-	X	X	X
Remove first bracket	X	X	X	X	X	X
Remove cross-member rear lower rivet	-	-	-	-	X	X
Remove battery tray	X	X	X	-	-	-
Remove wheel chock support	-	-	-	X	-	-
Attach stiffener plate to first bracket fastenings	X	X	X	X	X	X
Insert hexagon bolts in cross-member	-	-	-	-	X	X
Install washers	-	-	-	-	X	X
Screw up flanged nuts	-	-	-	-	X	X
Insert hexagon bolts in cross-member (quantity)	10	10	10	10	11	11
Install washers (quantity)	10	10	10	10	11	11
Screw up flanged nuts (quantity)	10	10	10	10	11	11
Refit battery tray	X	X	X	-	-	-
Fit wheel chock support spacer	-	-	-	X	-	-
Refit wheel chock support	-	-	-	X	-	-
Refit first bracket, if necessary	X	X	X	X	X	X
Fit 100-litre fuel tank wedge	-	-	-	X	X	X
Refit fuel tank	-	-	-	X	X	X

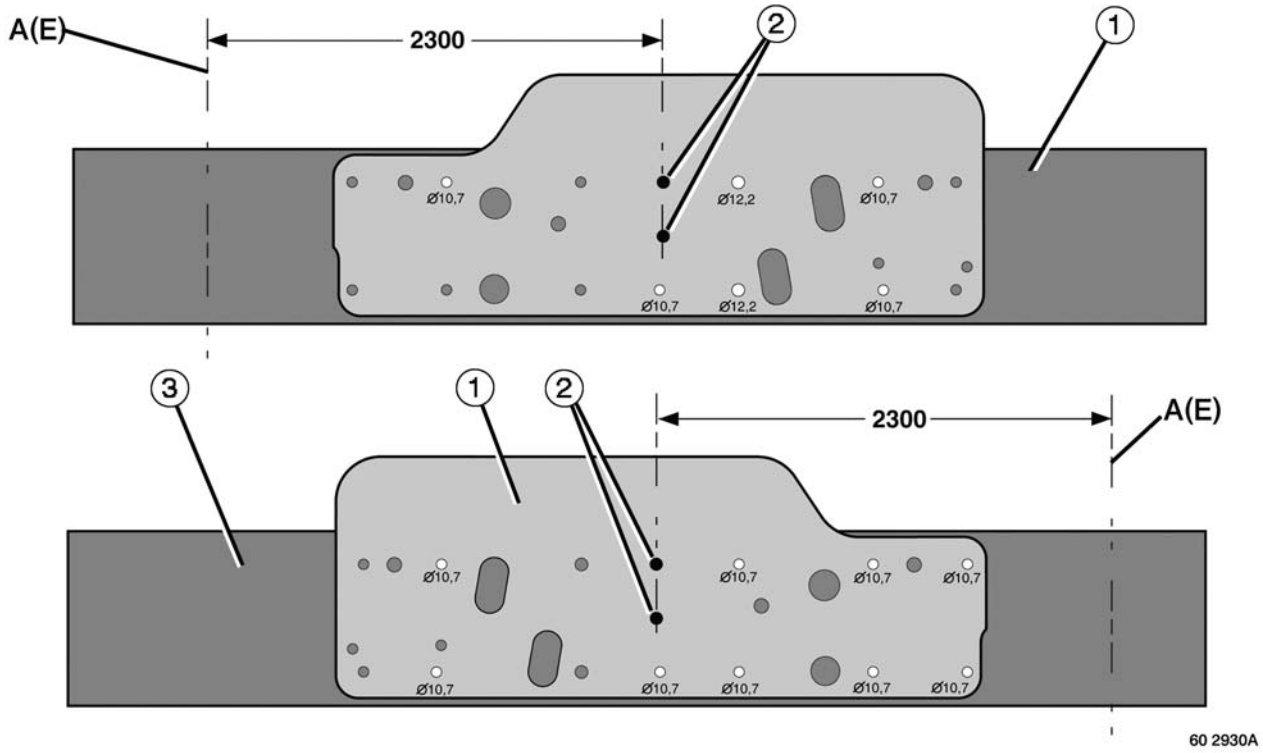
A (E) front axle centre-line
1 – Stiffener plate (part N° 50 10 580 557)
2 – 2 holes corresponding to fastening of the first bracket
3 – Sidemember

Double cab

Assembly of stiffener plate for wheelbase 3630 mm (left-hand and right-hand sidemember)

6 holes (white circles) to be counter-drilled in left-hand sidemembers.

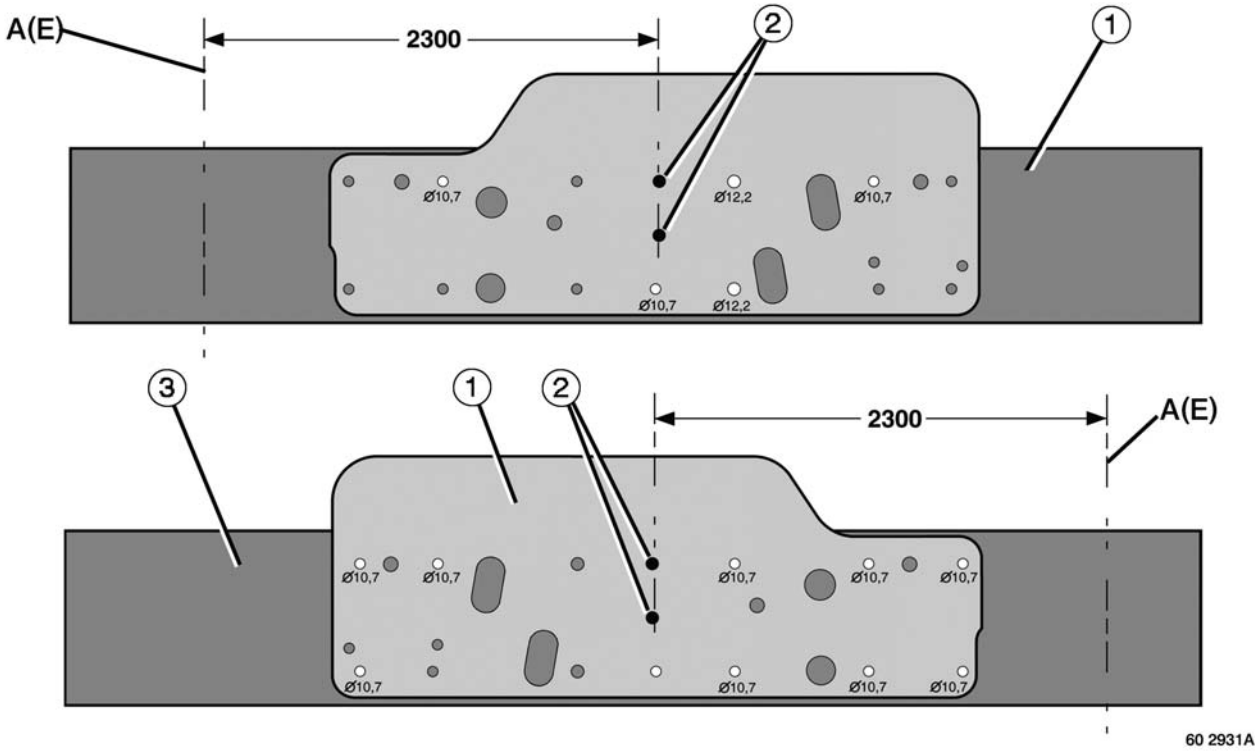
9 holes (white circles) to be counter-drilled in right-hand sidemembers.



Assembly of stiffener plate for wheelbase 4130 and 4630 mm (left-hand and right-hand sidemember)

5 holes (white circles) to be counter-drilled in left-hand sidemembers.

10 holes (white circles) to be counter-drilled in right-hand sidemembers.



5. TAIL LIFTS

Maximum tail lift lifting capacity: 1000 kg.

5.1 Sub-frame

The assembly of a tail lift requires the fitting of a sub-frame with a section where the minimal inertia is 1,000,000 mm^4 and meeting the recommendations described in the “Sub-frame” chapter.

5.2 Fastening

The tail lift is to be fastened by bolted plates. In all cases, the design should involve the body sub-frame.

Position of the nuts and bolts:
- It must meet the sidemembers drilling recommendations (see “Drilling in sidemembers” chapter)
- The nuts and bolts must be sufficiently spaced apart to avoid any sliding of the plate in relation to the sidemembers.

If necessary, it will be worthwhile to wedge the tail lift beam or plate on the lower flange of the chassis sidemember to avoid flexure of the sidemembers.

NOTE

Do not weld the plates to the chassis.

Tail lift type	Sub-frame	Min. sub-frame inertia	Attachment to sidemember	Attachment to sub-frame
500 Kg	80 x 60 x 4 steel class C	8.2 10^5	2 x 6 nuts & bolts in 2 rows	welding recommended (or 2 x 3 nuts & bolts)
750 Kg	100 x 60 x 4 steel class C	1.4 10^6	2 x 6 nuts & bolts in 2 rows	welding recommended (or 2 x 3 nuts & bolts)
1 000 Kg	120 x 60 x 4 steel class C	2.3 10^6	2 x 8 nuts & bolts in 2 rows	welding recommended (or 2 x 4 nuts & bolts)

Threaded hardware:
- Hexagon bolts M 10 x 125 - class 10.9
- Flanged nuts DRH M 10 x 125 - class 10
- Plain washers 10 x 27 x 3.

The use of nuts with nylon ring (e.g. Nyloc) is forbidden.

WARNING

In all cases, of adaptation of a lift gate, it is essential to calculate the new body length, while observing:
- Maximum plated gross vehicle weight (GVW).
- Minimum load on front axle, with the vehicle fitted with its body and equipped with tail lift.
- Maximum plated loads on front and rear axles.
- Maximum rear overhang indicated in the Type Approval Department’s descriptive sheet and the bodywork diagram.

If any one of these values are exceeded, consult the RENAULT TRUCKS Product Applications Department.

If the rear under-run guard is modified, comply with the regulations in force.

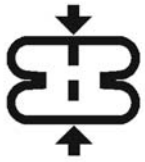
Compulsory for tail lifts

The installation of a tail lift compulsorily implies the assembly of a rear cross-member (see “Rear cross-member and towing cross-member” chapter).

6. ELECTRICAL PRE-ARRANGEMENTS

6.1 Bodybuilder warning pictograms available on information display

1 - Air suspension fault warning pictogram (available to bodybuilder)



2 – Body interior lighting warning pictogram (available to bodybuilder)

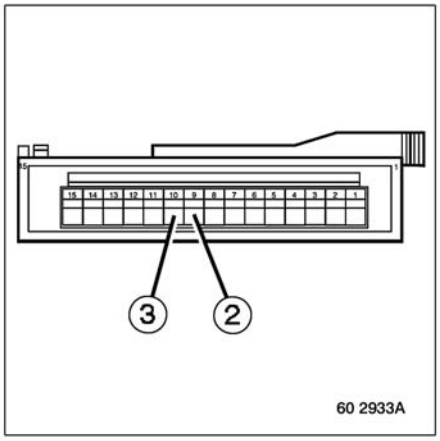
3 – Special machine warning pictogram (available to bodybuilder)

4 - Air suspension fault warning pictogram (available to bodybuilder)

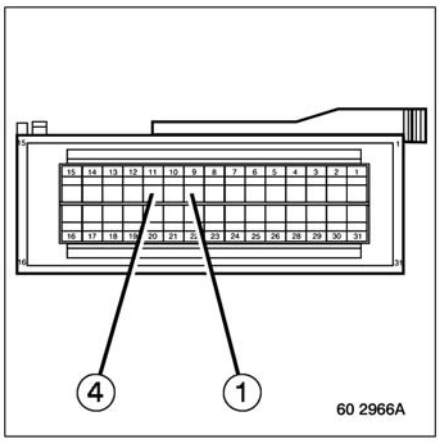
Wiring

To wire information to a warning lamp, gain access to the rear of information display (**A**), identify the green 15-way connector (**B**) and the red 30-way connector (**C**).

On connector (**B**):
- Wire warning lamp information (**2**) to track 9.
- Wire warning lamp information (**3**) to track 10.



On connector (**C**):
- Wire warning lamp information (**1**) to track 9.
- Wire warning lamp information (**4**) to track 11.



Warning lamps (**2**) and (**4**) are to be supplied with + 12 V.
Warning lamps (**1**) and (**4**) are to be supplied with earth.

NOTE

The information is pre-wired. Wires section 0.35 mm^2 are on stand-by on the main strand supplying the information display.

6.2 Available power supplies

Three possibilities are offered for connecting receivers to available power supplies:
- Available power supplies in the cab.
- Available power supplies on the chassis (black 6-way connector).
- Available power supply to the rear of the cab for connecting side marker lamps to the bodywork.

It is also possible to connect extra signalling devices insofar as they do not create overcurrent, by connecting up to the trailer socket connector from the chassis wiring harness.

For further information on electrical diagrams, consult workshop manual section MR 70 141 available from the RENAULT TRUCKS Spare Parts department.

6.2.1 Available power supplies in the cab

Located on Fuses / Relays Box "BFR" (1)

The fuses assigned to this function are:
- FU 25: after ignition “+”.
- FU 26: after ignition “+”.

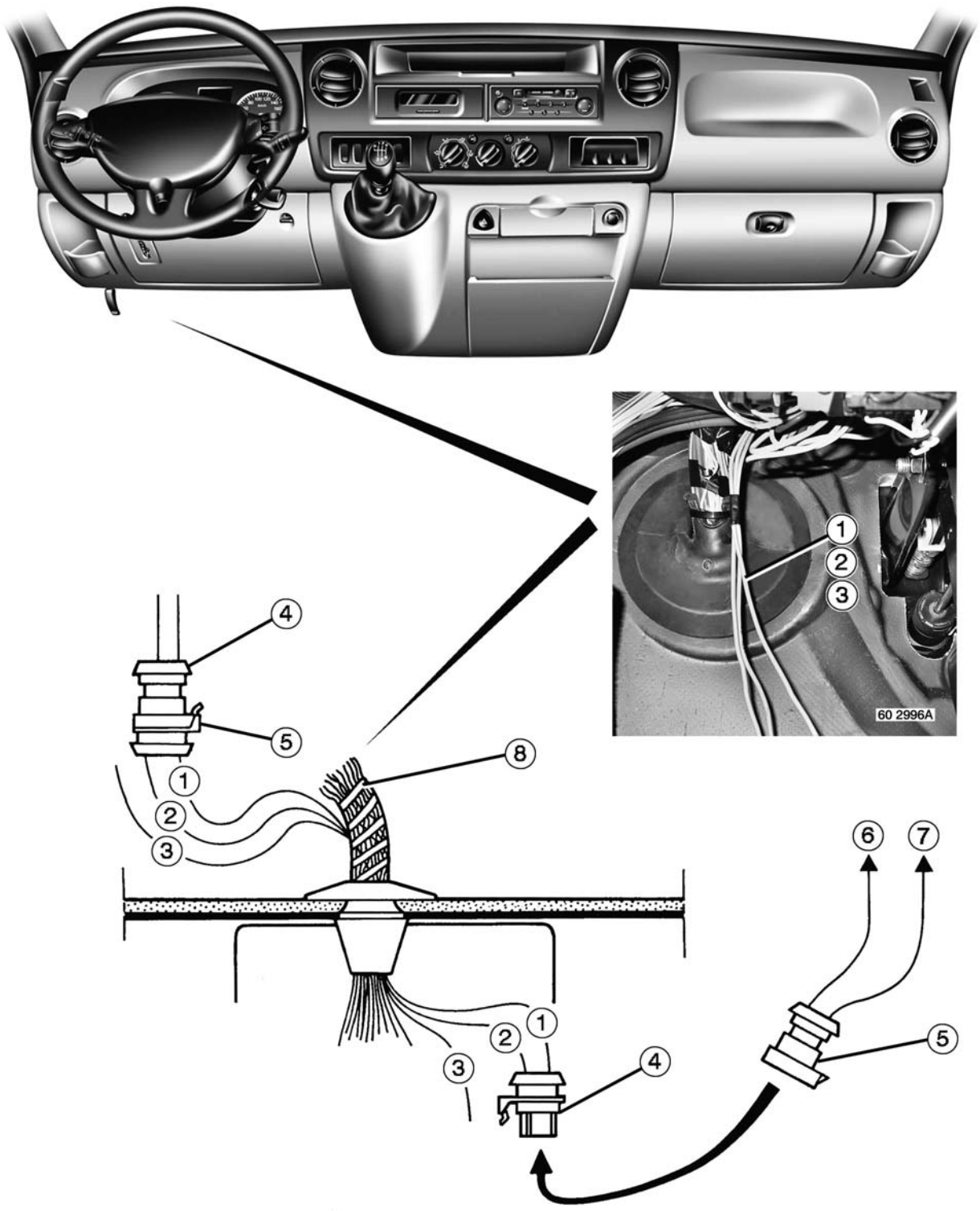
IMPORTANT
The information given above is to be strictly applied for piloting relays (on vehicles registered in 2004). For vehicles in service as from 2005, this information applies for piloting power.
For further information, it is essential to contact the RENAULT TRUCKS Product Applications Department.

Wires (**1**), (**2**) and (**3**) are to be used for installations (control, information…) requiring the passage of wires through the front end:
In the cab, wires (**1**), (**2**) and (**3**), length 20 cm approx., are inserted in the strand of wires of harness (**8**) close to the front end wiring harness seal.

To connect these wires, use:
- a female 6-way connector (**5**) part N° 77 03 197 259
- a male 6-way connector (**4**) part N° 77 03 197 810
- spade terminals part N° 50 00 812 492
- clips part N° 50 00 812 493.

Provide a hermetic seal for the wiring harness with a heat shrunk sheath sleeve. Heat the sheath with a hot air gun to shrink it. The use of tools producing naked flames is forbidden.

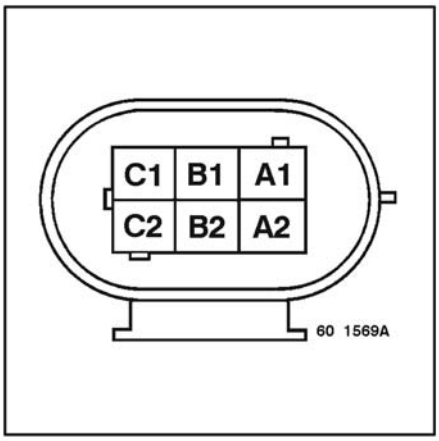
Maximum permissible current: 10 Amps per line.

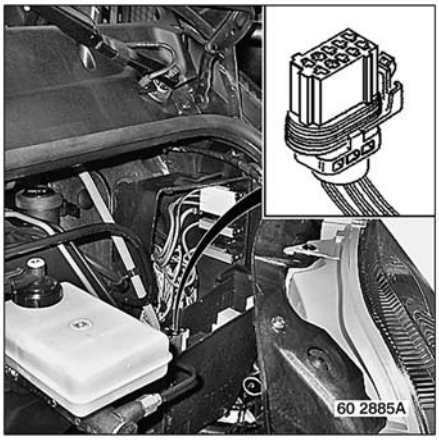

1
2
3
60 2996A
4
5
8
1
2
3
6
7
5
2
1
3
4
60 2884A

Available power supplies in the engine compartment

Assignment of black 6-way bodybuilder connector terminals in Intermediate Engine Fuses / Relays box (BIM):

- A1: chassis battery supply "+" available power supply (red wire) (F4-10A)
- B1: chassis after ignition "+" available power supply (yellow wire) (F3-10A)
- C1: earth (black wire)
- A2: wire (**1**) crossing front end (grey wire) not assigned
- B2: wire (**2**) crossing front end (grey wire) not assigned
- C2: wire (**3**) crossing front end (grey wire) not assigned



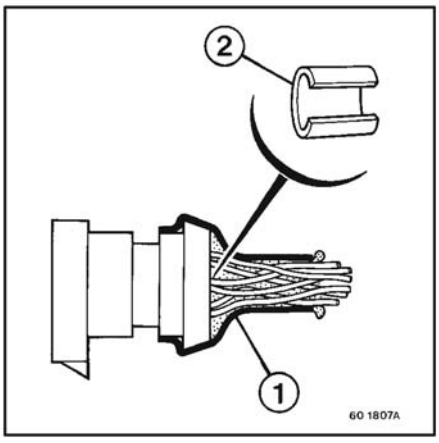


Use heat shrunk sheath sleeve (**1**) and adhesive sleeves (**2**) supplied in the kit. The adhesive sleeves must be inserted in the sheath before it is shrunk.

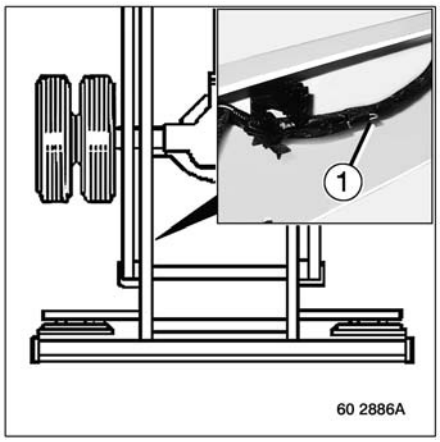
Connect the equipment to the corresponding wires.

The wires must have a section of 2 mm^2, protected by a sealed sheath over their entire length.

Use electrical wire and a sheath heat resistant to temperatures of 120°C.



6.2.2 Available power supplies on the chassis



Available power supplies for connecting side marker lamps to the bodywork

For connecting side marker lamps to the bodywork, there is a pre-arrangement on the chassis wiring harness.
Two cut wires are bent back in the wiring harness (**1**) on the left-hand sidemember near the rear overhang.

Assignment of the wires:
- blue wire: side/parking lights power supply
- black wire: earth

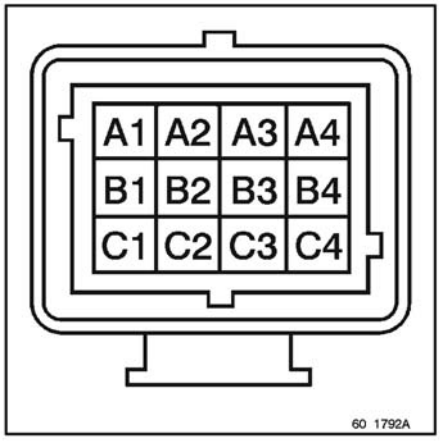
These wires have a section of 0.75 mm^2. They accept a maximum current of 5 Amps.
For connection, use insulated and adapted connections.

Connection of rear signalling devices to the chassis wiring harness

For connecting up signalling devices to the rear of the chassis, the installer can make an electrical tapping on the chassis wiring harness. This tapping can be made either:
- by connecting up to the trailer wiring harness connector in the absence of a towing device,
- or by making off-branches to the chassis wiring harness or to the trailer socket wiring harness.

IMPORTANT
Plug in a connector equipped with its own wiring harness into the "trailer wiring harness" connector.
Use a wire with 2 mm^2 section.
Provide a hermetic seal for the wiring harness with a heat shrunk sheath sleeve. Heat the sheath with a hot air gun to shrink it. The use of tools producing naked flames is forbidden.

Assignment of connector terminals on chassis wiring harness and fuse ratings for each line:



- terminal A1: trailer LH side/parking lamp (blue wire) (F14-5A)
- terminal A2: trailer RH side/parking lamp (blue wire) (F15-5A)
- terminal A3: earth (black wire)
- terminal B1: trailer LH flashing lamp (orange wire) (F37-30A)
- terminal B2: trailer RH flashing lamp (green wire) (F37-30A)
- terminal B3: reversing lamp (purple wire)
- terminal B4: mechanical trailer (white wire) (F5-15A)
- terminal C1: trailer stop lamp (brown wire) (F515A)
- terminal C2: trailer fog lamp (white wire) (F20-10A)
- terminal C3: earth (black wire)
- terminals A4 and C4: not assigned

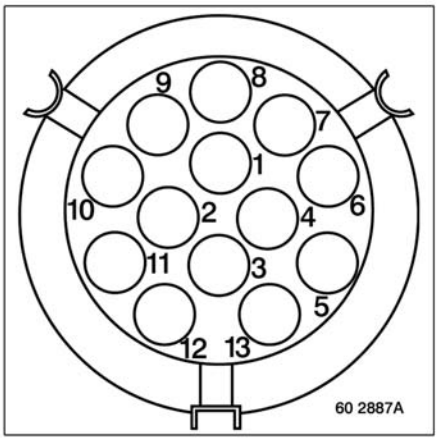
Off-branches on chassis wiring harness or on trailer socket wiring harness

If the vehicle is provided with a towing device with signalling system, it is possible to by-pass the lines to supply the extra signalling lamps with power by installing a junction box on the chassis wiring harness in which the off-branches are to be made.
This box must be hermetically sealed and securely fastened to the chassis.

IMPORTANT
- *Before connecting up extra signalling devices, check that the assembly does not lead to overcurrent (see the fuse rating for each line).* ***It is strictly forbidden to alter the fuse ratings.***
- *In the event of connection of extra direction indicator lamps to a vehicle not provided with the towing pre-arrangement, replace the original flasher unit part N° 77 00 377 037 by a flasher unit part N° 77 00 377 199 available from the RENAULT TRUCKS Spare Parts Department.*

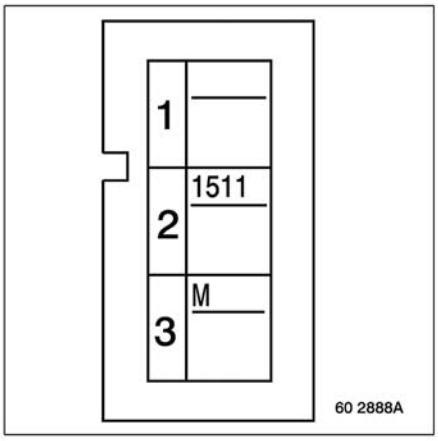
Assignment of connector terminals on trailer socket:

- Terminal 1: trailer LH flashing lamp (orange wire) (F37-30A)
- Terminal 2: trailer fog lamp (white wire) (F20-10A)
- Terminal 3: earth (black wire)
- Terminal 4: trailer RH flashing lamp (green wire) (F37-30A)
- Terminal 5: trailer RH side/parking lamp (blue wire) (F15-5A)
- Terminal 6: trailer stop lamp (brown wire) (F5-15A)
- Terminal 7: trailer LH side/parking lamp (blue wire) (F14-5A)
- Terminal 8: trailer reversing lamp (purple wire) (F5-15A)
- Terminal 13: earth (black wire)



Assignment of connector terminals on trailer socket switch connector:

- Terminal 2: mechanical trailer (white wire)
- Terminal 3: earth (black wire).

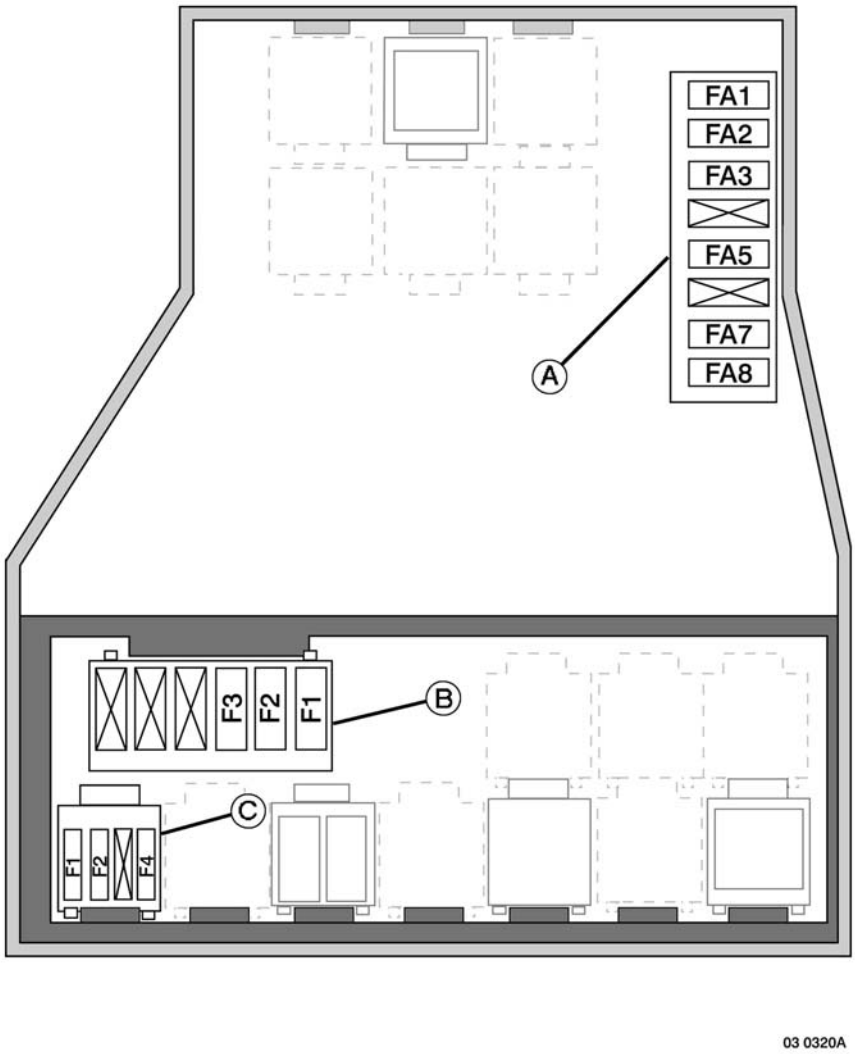


6.3 Battery cut-out

The battery cut-out must be wired after the battery positive terminal.
The battery cut-out is to be fastened to the battery tray (or close by), depending on its overall dimensions and in relation to the environment.

It is however necessary for the "safety" function to be supplied by battery "+" feed when the master switch is open.
To do this, disconnect the 30 A max. fuse (F2) on fuse board (B) in the lower compartment of the Intermediate Engine Fuses / Relays box (BIM) and connect it with a DC battery "+" in parallel with the battery cut-out.
It is also necessary to keep the Cockpit Central Unit (UCH) battery "+" power supply (FU31, red wire with section 4 mm^2.

The "safety" function supplies electrical locking of closures and supplies the two flashing "Warning" lights.



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Choose the master switch according to the vehicle's maximum power rating.

Part numbers used at RENAULT TRUCKS:

- mechanical (part N° 50 10 480 403)
- electrical (part N° 50 10 589 138)
- ADR (part N° 50 10 480 404)

These parts are available from the RENAULT TRUCKS Spare Parts Department.

6.4 Anti-intrusion alarm for built-on body

It is necessary for the vehicle o be equipped with the alarm function (vehicle equipped with Cockpit Central Unit (UCH) with alarm function).

Wiring of a jamb switch
For a built-on body, w advise you to recuperate the adequate potential for the Cockpit Central Unit (UCH). A hook-up connector is on stand-by in the right-hand side of the cab roof (two black wafer holders).
On the black connection wafer, identify track 7 of the green wire (13 N).
This wire is connected to the Cockpit Central Unit (UCH) and analyses the information coming from the latter like the jamb switch of a rear door.
Wire the switch contact up to this information and with the vehicle earth.

IMPORTANT
Warning: Do not wire the overhead lamp in series with the jamb switch.

Closing the closures
It is possible to wire an electrical striker in parallel with an existing striker.
The easiest way is to recuperate the information on the same connection.
Identify the black wafer on one of the connections, then identify tracks 5 (20C) and 6 (20D) of the wires:
- White wire section 0.75 mm^2 commands opening of the closures.
- Beige wire section 0.75 mm^2 commands closing of the closures

6.5 Cab interior lighting power supply

- Use the pre-arrangement described in the chapter "Available power supplies for connecting side marker lamps to the bodywork".
- Use bodybuilder warning lamp (**2**) "Lighting control".

IMPORTANT
The wiring harness must be routed along the right-hand sidemember (opposite the exhaust).
(See routing recommendations in chapter A).

6.6 Wiring an engine running after ignition "+" feed

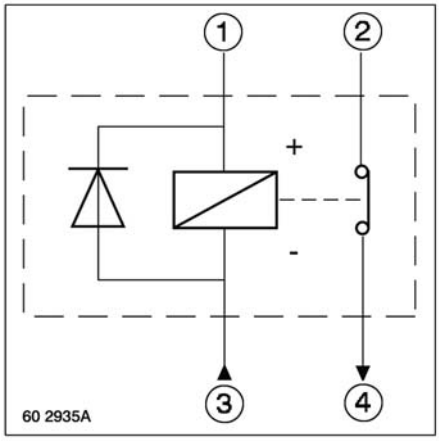
The "engine running" information is to be found in the Intermediate Engine Fuses / Relays box (BIM).
At engine connection level (blue spade terminal holder), there is a pre-arranged wire with the "engine running" information (unstripped cut wire section 0.5 mm^2, length 200 mm, orange in colour).

NOTE
This information is to be relayed without fail.

Wire the command of the relay with + 12 V and with the engine running information (earth provided by the oil pressure switch). Wire a normally-closed contact (essential) of a relay, a 12 V "after ignition +" (essential) and the system to be supplied.

When the engine is running, the relay coil is supplied and the relay contact opens.
Combined with the bodybuilder pre-arrangement to be found in the Intermediate Engine Fuses / Relays box (BIM) (black 6-way connector), an "after ignition +" (12V, 10A) or an "engine running" earth can subsequently be made available.

1 – "after ignition +"
2 – 12 V "after ignition +"
3 – "engine running" information
4 – to bodybuilder equipment



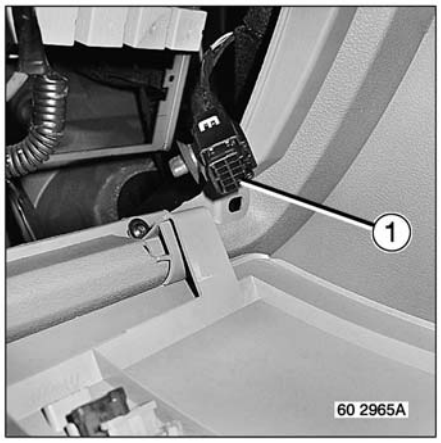
6.7 Remote stopping of the engine

To stop the engine remotely, it involves cutting the power supply after the injection ECU contact.
In the lower part of the Intermediate Engine Fuses / Relays box (BIM), under the board containing 6 max. fuses and on a relay support where there are 4 auto fuses, the 20 A fuse is the fuse that protects the injection ECU contact.
The supply wire is a 5 mm^2 red wire. It involves arranging a cut-off device such as a palm type switch in series with this after ignition supply.

6.8 Telephone pre-arrangement

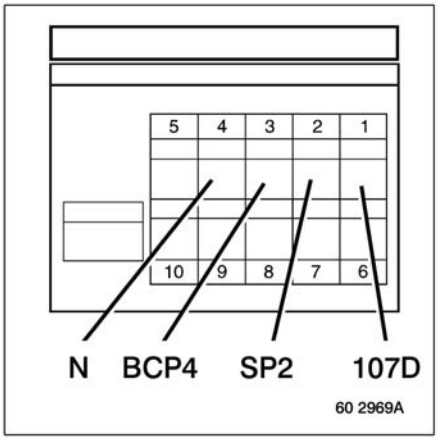
Hands-free telephone kit
This is an aftermarket fitment kit consisting of a telephone support bracket and adaptation parts that serve to fit the bracket to the dashboard, a microphone, and electronic box (telephone management box) and a wiring sling.

A black 10-way connector (1) (part N° 77 03 297 733) is on stand-by in the dashboard.



Assignment of the wires:

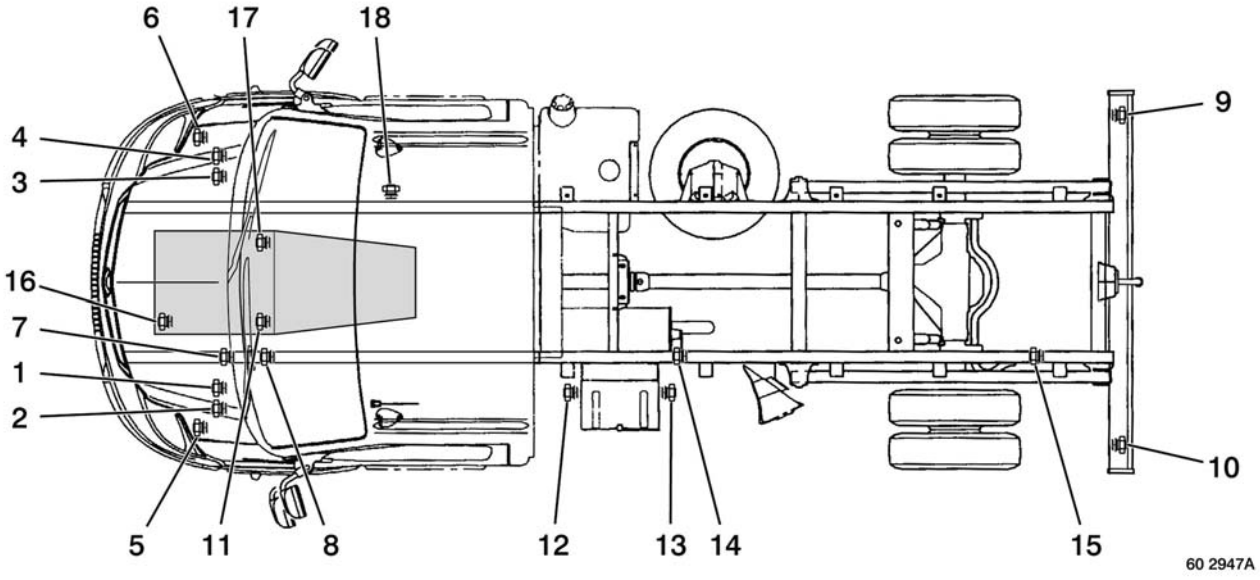
107D – telephone, radio cut-off information
SP2 – auxiliary equipment (radio fuse protection)
BCP4 – protected battery +
N – electronic earth



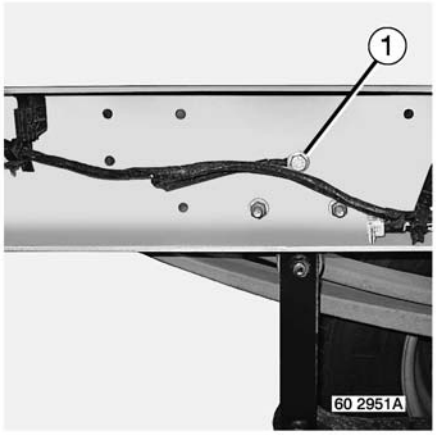
6.9 Earths

Earths layout

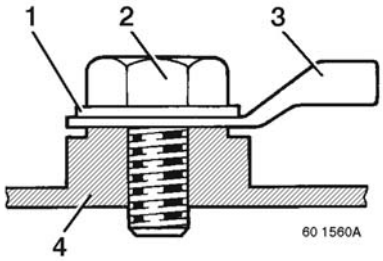
Item	Earth designation	Fastening	Tightening torque (Nm)
1	Sidemember / cab	Hex. self-tapping bolt M8x22	21
2	Engine / cab wiring harness	Hex. self-tapping bolt M8x22	21
3	ABS / cab wiring harness	Hex. self-tapping bolt M8x22	21
4	Front end / cab wiring harness	Hex. self-tapping bolt M8x22	21
5	Front end / cab wiring harness	Hex. self-tapping bolt M8x16	10
6	Front end / cab wiring harness	Hex. self-tapping bolt M8x16	10
7	Engine / sidemember wiring harness	Hex. bolt M10x125x30 Flanged nut DRH M10x125	62
8	Cab sidemember / engine block	Hex. bolt M10x125x30 Flanged nut DRH M10x125	62
9	Right-hand sill / body wiring harness	Hex. self-tapping bolt M6x16	10
10	Left-hand sill / body wiring harness	Hex. self-tapping bolt M6x16	10
11	Engine block / sidemember	Hex bolt M8x125x16	21
12	Positive start / battery wiring harness	Flanged nut DRH M8x125 Hex nut M6x100	6.5 4.5
13	Battery / sidemember	Hex. bolt M6x100	4.5
14	Sidemember / battery	Hex. bolt M10x125x30	62
15	ABS / chassis wiring harness	Hex. bolt M10x125x30 Flanged nut DRH M10x125	62
16	Alternator wiring harness	Flanged nut DRH M8x125	8
17	Starter wiring harness	Flanged nut DRH M8x125 Terminal lug nut M5	8 3
18	Engine / booster pump wiring harness	Terminal lug nut M4 Terminal lug nut M5	1.6 1.6



Cab earths
Cab earths pre-arrangement: welded nuts (**1**) on wheelarch in engine compartment.



Fastening the terminal lug or the earth braid
The earth lug can be connected:
- to the cab main earth (right-hand wheelarch in engine compartment);
- to the pre-arrangements (wheelarch in engine compartment).



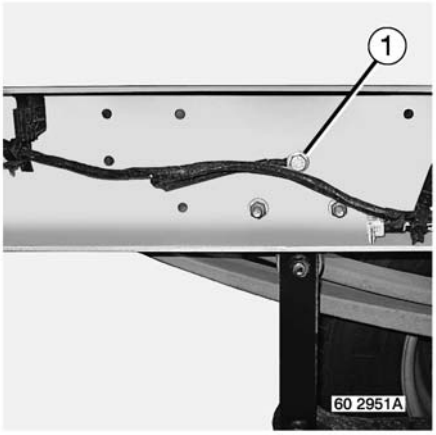
Fastening the earth terminal lug to the pre-arrangement
- Tap the bore to diameter 8 x 1.25 mm.
- Scrape the paint on the support surface.
- Provide protection against corrosion with a zinc aerosol spray.

1 – Stainless steel plain washer dia. 8
2 – Stainless steel bolt M8
3 – Flat lug or earth braid
4 – Pre-arrangement (welded nut) on vehicle

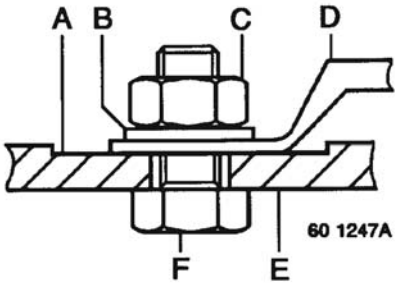
Tightening torque of screw (**2**): 9 ± 1 N.m

Zinc aerosol spray (available from the Spare Parts Department, part N° 77 01 406 425).

Chassis earths
Chassis earths (**1**) on sidemember.



Assembly on electrical earth points dia. 11
A - Spotface dia. 45 mm, bared and protected with zinc paint
B - Plain stainless steel washer dia. 10 mm
C - Stainless steel nut H10 x 150
D - Earth lug or braid
E - Sidemember
F - Stainless steel bolt M10 x 150
G - Painted sidemember
H - Electrical earths fixing hole dia. 11 mm



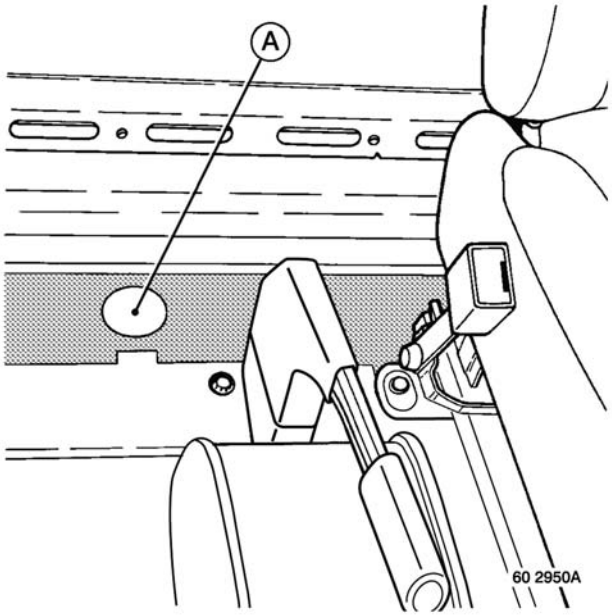
Tightening torque: 45 Nm ± 20%.

6.10 Passage of wiring harnesses through cab

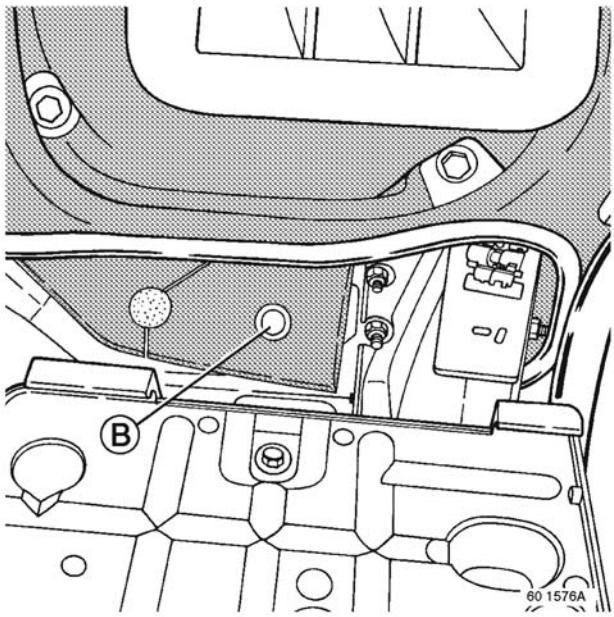
To make the link between the outside and the inside of the cab, two passages are possible for routing the wiring harnesses. Any passage other than those described in this document are forbidden.

Passage through rear of cab (single cab only)
In a circle made in the floor soundproofing screen, an impression (**A**) centred on the side and 80 mm away from the rear end indicates the point of drilling.

At point (**A**), drill a hole of 50 mm maximum diameter to allow passage of the wiring harness.
Deburr the hole after drilling and provide protection against corrosion using a zinc aerosol spray.
Provide a hermetic seal with a grommet and a gasket.



Passage through front end (all vehicles)
For the passageway left for the steering column, on the side opposite the steering wheel on the front end:
Disengage the cab floor carpet.
In the engine compartment, make a drilling centred on the port (**B**) of the soundproofing screen.
Deburr the hole after drilling and provide protection against corrosion using a zinc aerosol spray.
Engage the wiring harness through the front and through the soundproofing screen.
Provide a hermetic seal with a grommet and a gasket.



7. FAST IDLING

Depending on your vehicle's equipment

For using equipment (PTO, tipper, etc…), a minimum engine speed, a standard engine speed and a maximum engine peed are programmed in the electronic box.

Works setting:

minimum: 900 rpm

maximum: 3500 rpm

Depending on the equipment built by the equipment manufacturer, this engine speed can be modified by means of the RENAULT TRUCKS test tool.

The fast idling engine speed band can be programmed from a starting switch and two buttons acting directly on the fuel-injection ECU.

This band covers all engine speeds from idling (750 rpm) to cut-off (4000 rpm).

Operating condition

The vehicle road speed must be lower than the maximum threshold speed for which parameters can be defined using the RENAULT TRUCKS tool (works setting: 22 km/h).

The brake pedal or clutch pedal do not need to be depressed.

Operation

Press control switch (A3) to position B to select the "fast idling" feature.

Press control switch (A2) to position A to activate the "fast idling" function. The engine automatically takes up the memorized speed (for the last engine speed used, see NOTE).

Press control switch (A1) towards position + or position – to vary the engine speed between the minimum threshold and the maximum threshold.

Keeping the control switch pressed allows gradual variation. Brief dabs on the control switch allow variations in 50 rpm steps.

The accelerator pedal serves to vary the engine speed between the set-point and the maximum threshold.

To inhibit the "fast idling" feature, press control switch (A2) t position B.

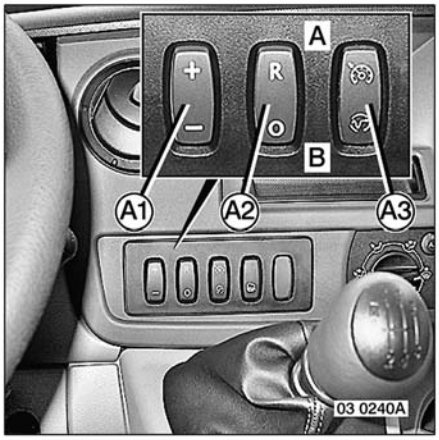
Actions causing the feature to quit:

- Depressing the brake pedal or the clutch pedal.
- Vehicle speed higher than the maximum threshold speed.
- Pressing control switch (A3) to neutral or to position A.
- Pressing control switch (A2) to position B.

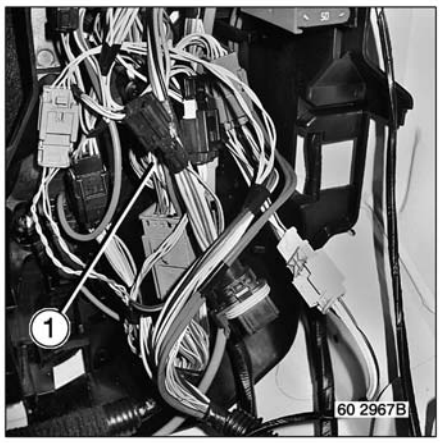
NOTE

Whenever the "fast idling" feature is quitted, the last set-point is memorized. This is the set-point that will be recalled the next time the "fast idling" feature is used.

IMPORTANT
When you quit the "fast idling" feature, make sure the engine speed is not too high for the next time the "fast idling" feature is used.
Especially if your vehicle features equipment where the operating speed is limited.



Off-set fast idling control
To vary the engine speed remotely, a connector (**1**) is on stand-by in the Intermediate Engine Fuses / Relays box (BIM).
The other arrangement to be used in conjunction with this is a clip-holder (part N° 77 03 297 542).



8. POWER TAKE-OFF

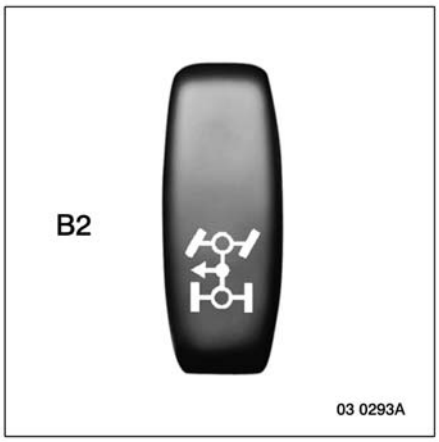
Gearbox-mounted power take-off

With the vehicle at a standstill, engine idling, gearbox in neutral, release the clutch and wait for 7 seconds.

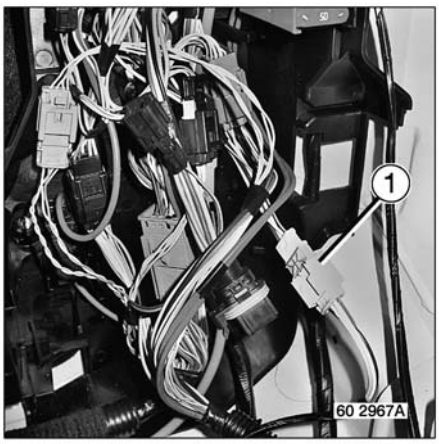
Press control switch (B2).
Engage the clutch.
As from that moment, the PTO rotates. The warning pictogram should appear.
To put the PTO into neutral, release the clutch and press control switch (B2).
The warning pictogram disappears.

Rotating speed

In the event of equipment driven by the PTO, do not exceed the rotating speed indicated by the equipment manufacturer.
To do this, you can use the "fast idling" feature.



- Chassis part PTO wiring harness part N° 82 00 338 460.
- Chassis / dashboard intermediate PTO wiring harness part N° 82 00 344 391.
- PTO hook-up connector (**1**) available in the Intermediate Engine Fuses / Relays box (BIM).



IMPORTANT
Vehicle equipped with refrigerator unit
If the vehicle is equipped with a roof deflector, ensure that the deflector does not interfere with correct operation of the refrigerator unit (limited cooling of the compressor).

CHAPTER -C-
SUPPLEMENTARY INFORMATION
ON THE “RENAULT MASCOTT” VEHICLE

1. DRIVE FOR A MECHANICAL RECEIVER

The “RENAULT MASCOTT” vehicle offers two drive possibilities:
- by crankshaft pulley.
- by gearbox-mounted PTO.

IMPORTANT
It is formally forbidden to work on the “Common rail” injection system while the engine is running.
For further information on the “Common rail” system, consult workshop manual section MR 20 081 together with the vehicle driving and servicing handbook.

1.1 Drive by crankshaft pulley

It is possible to drive equipment (refrigerator compressor, pump, additional alternator...) via the crankshaft pulley.

Maximum equipment driving torque: 90 Nm (instant torque).
Full-time drive is possible.

The crankshaft pulley for driving a receiver is specific. It is available from the RENAULT TRUCKS Spare Parts Department.
The equipment must be positioned in the planned location to the right of the engine.

The equipment should not produce mechanical or thermal deterioration to the surrounding parts (engine, soundproofing screens, alternator, wiring harnesses, piping...).

Manufacture of the engine-mounted PTO bracket is at the expense of the equipment manufacturer.

Fastening of the equipment bracket to the engine (see following page):

- Direct assembly on engine block by 4 tapped holes.

Engine idling speed = 750 ± 50 rpm.

Max. power engine speed = 3600 rpm.

No-load engine speed = 4000 rpm.

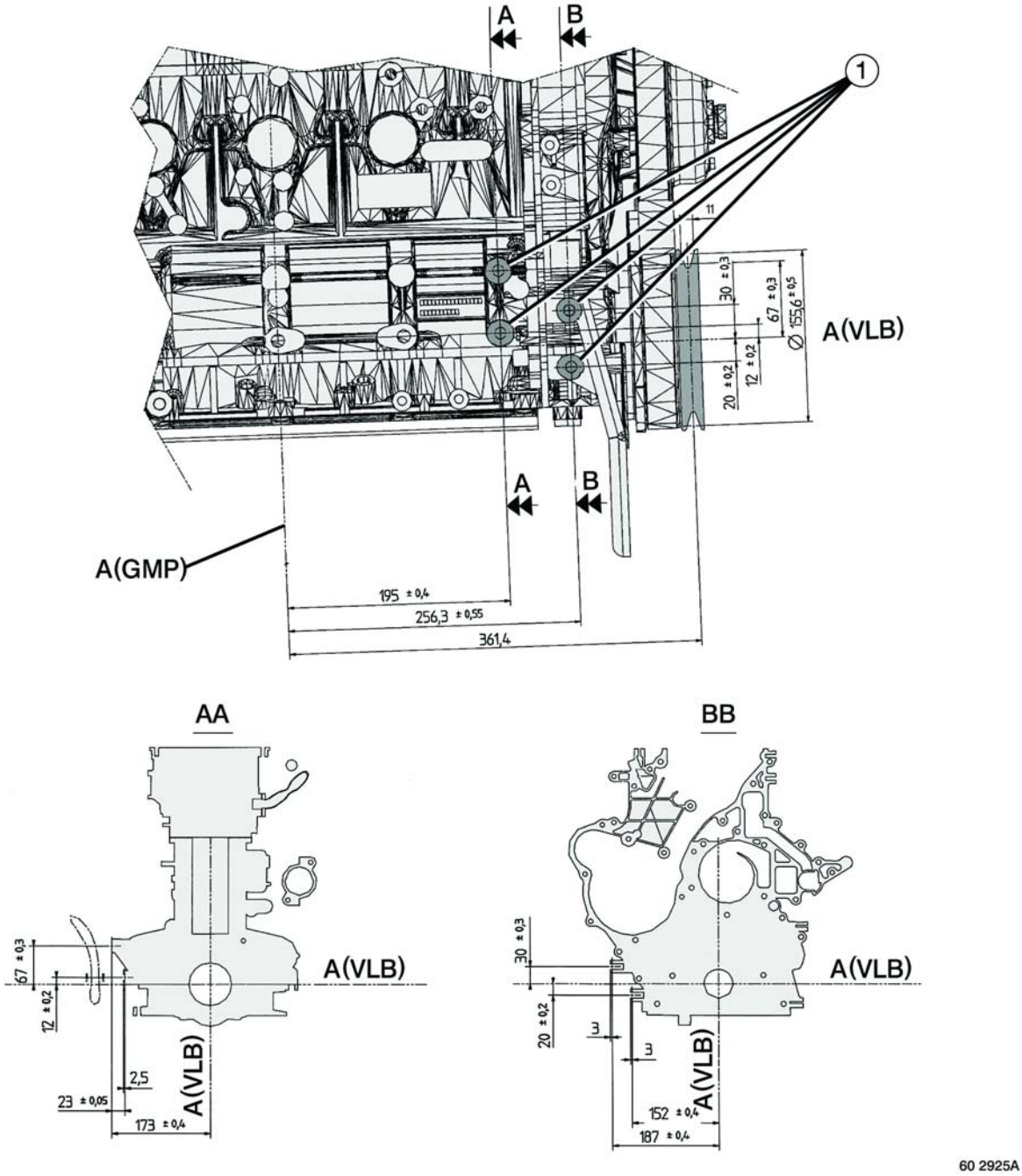
It is forbidden to modify:
- engine cooling and lubrication system pipes and fastenings,
- wiring harnesses,
- soundproofing screens,
- engine block drillings and machinings.

Fastening the equipment bracket to the engine block

Fasten the equipment bracket to the engine by means of 4 threaded drillings (1) made in the engine block.

1 - Screw-thread: M10 x 125

A (VLB) – Crankshaft centre-line
A (GMP) – Engine centre-line



Drive pulley

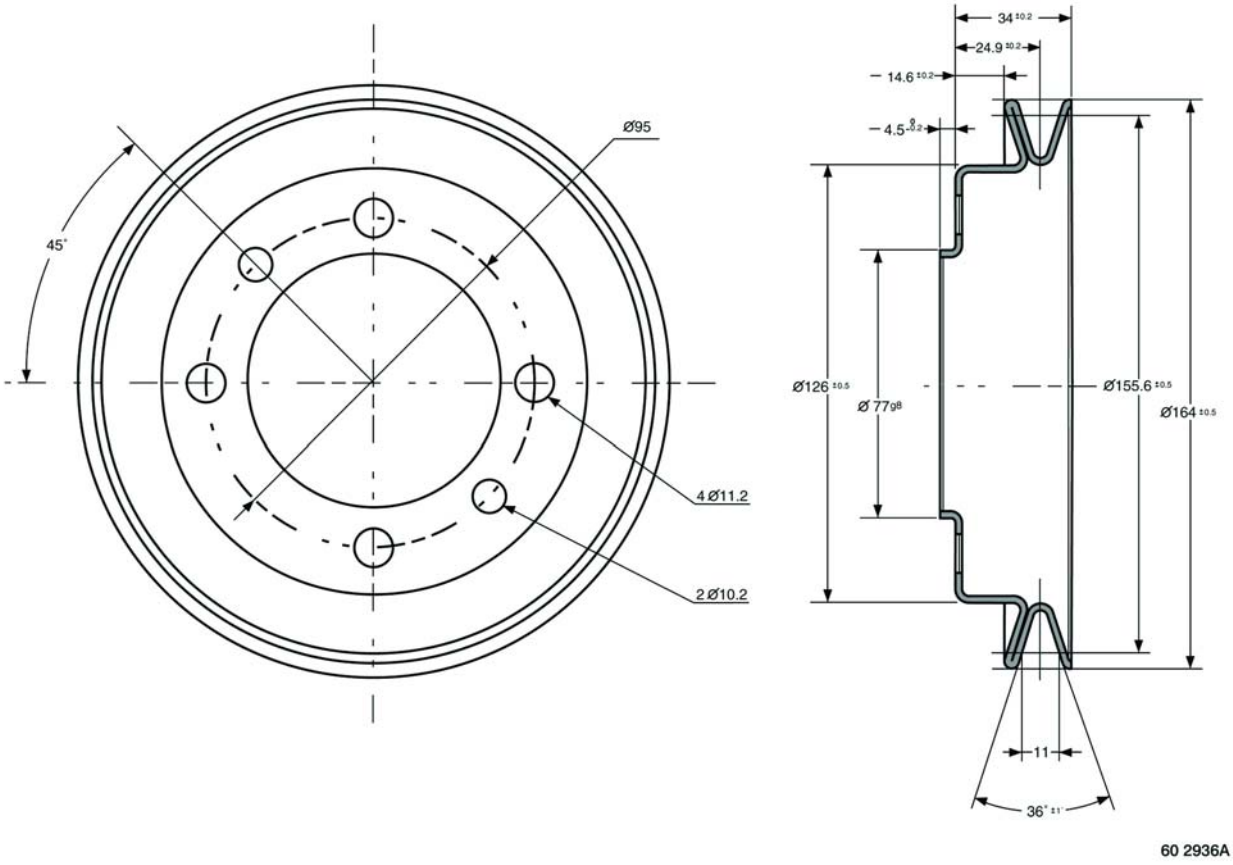
(part N° 50 10 553 764)

- Power torque: 18.2 Nm
- Weight: 8 kg maximum, with 140 mm overhang
- Maximum vibration: 14 g

Attachment:

- 4 socket hex. bolts M10 x 150 x 20 – class 10.9
- 4 plain washer 10 x 20 x 2.5

Tightening torque: 44 ± 6 Nm



1.2 Gearbox-mounted PTO

The gearbox-mounted PTO (optional assembly on new vehicle) is equipment that can be adapted in the after-market if the vehicle is equipped with the pre-arrangement. The operating control for the PTO is electrical: it is managed by a PTO safety box receiving information:
- from the cab control switches
- from the PTO position contacts.

PTO operation and maintenance recommendations: see vehicle driving and servicing handbook.

Maximum resistant torque:
- PTO 22Z1 (ZF 5 S 270 gearbox): 120 Nm
- PTO 22Z2 (ZF 6 S 350 gearbox): 180 Nm

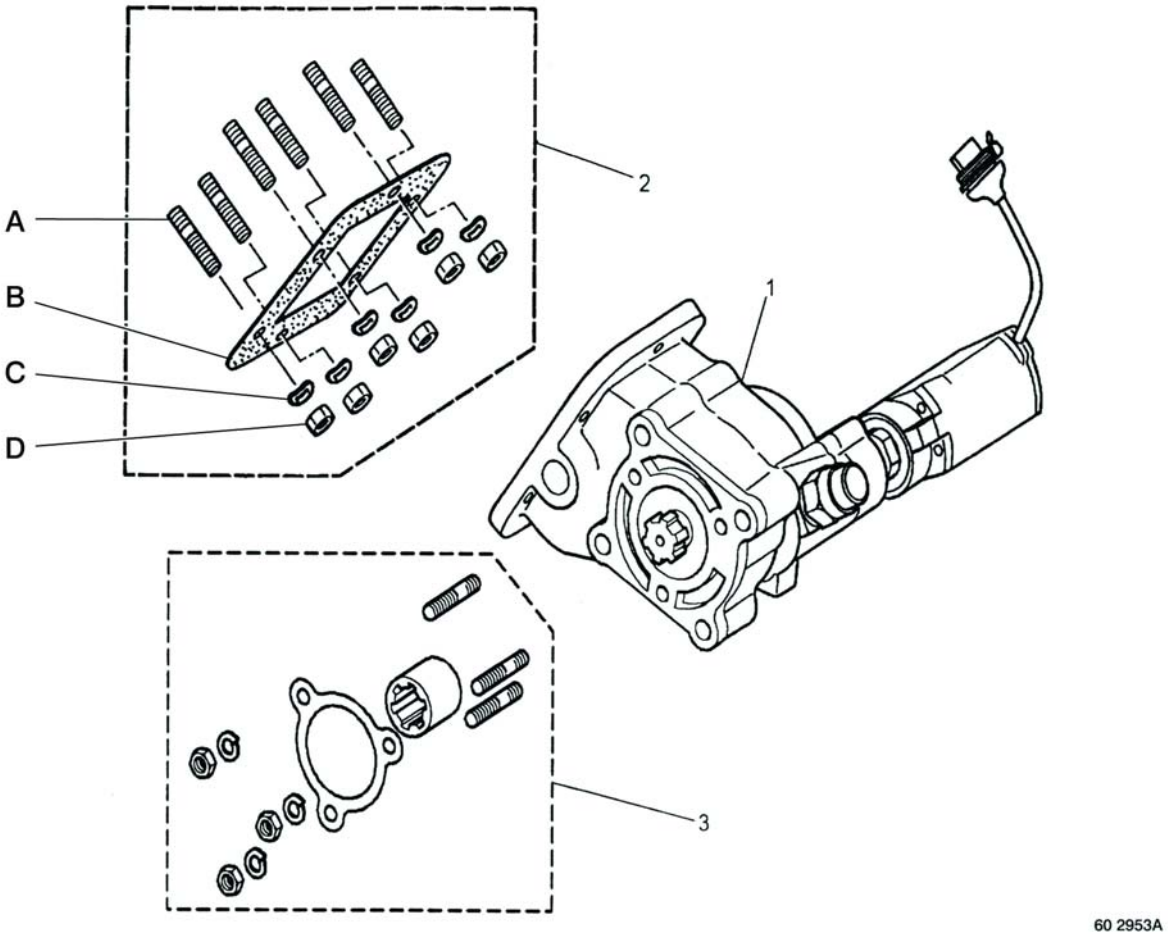
Weight:
- PTO 22Z1: 6 kg
- PTO 22Z2: 6 kg

Drive ratio in relation to engine rotating speed:
22Z1 = 1
22Z2 = 0.91

Output shaft: splined shaft.
For assembling different output shafts, consult the PTO manufacturer.

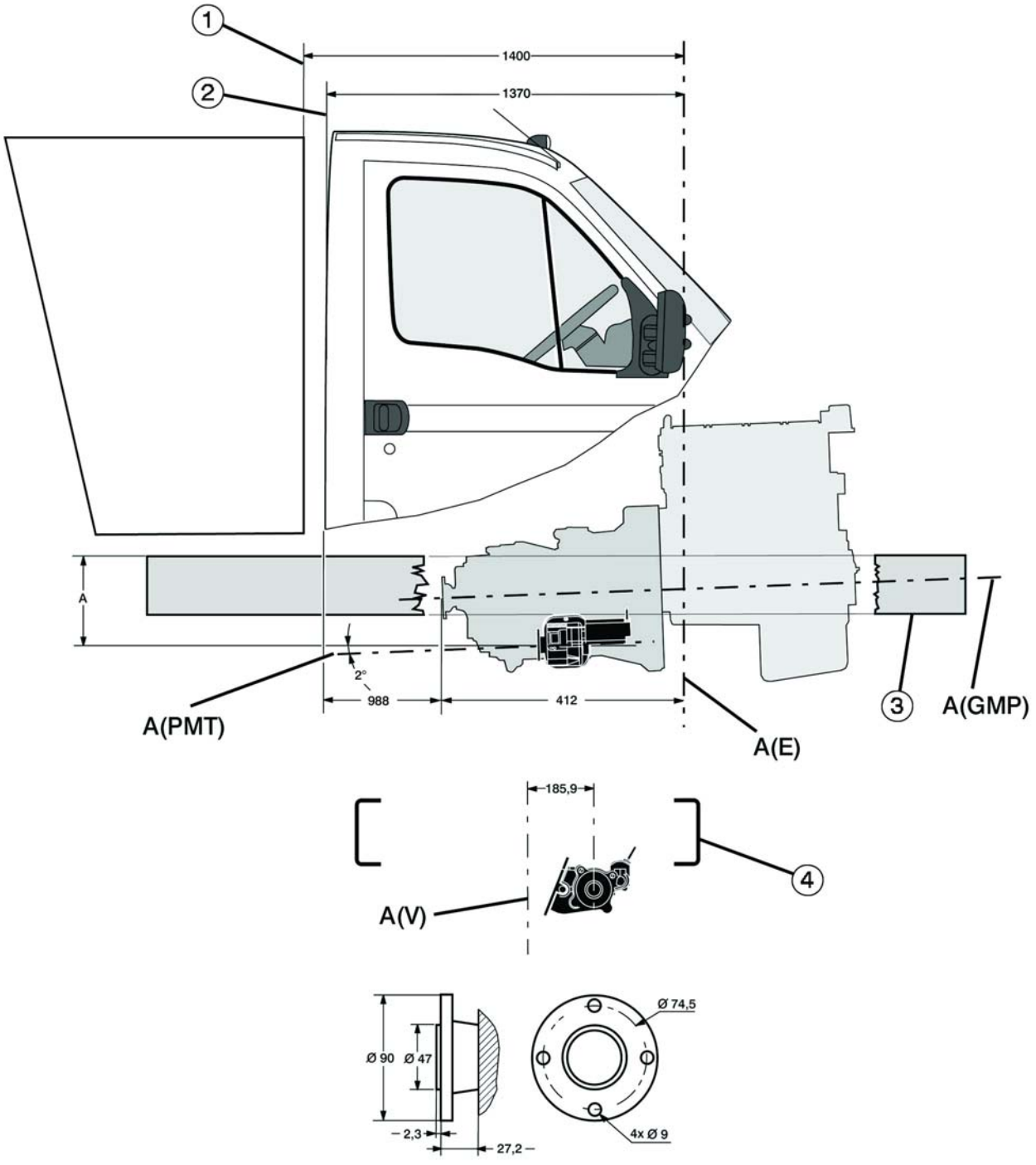
Procurement (parts available from the RENAULT TRUCKS Spare Parts Department.
- PTO 22Z1 (**1**) (ZF gearbox ZF 5 S 270), part N° 50 10 545 226
- PTO 22Z2 (**1**) (ZF gearbox ZF 6 S 350), part N° 50 10 545 227
- Gearbox attachment kit (**2**), part N° 50 10 545 700
- Chassis part PTO wiring harness part N° 82 00 338 460
- Chassis / dashboard intermediate wiring harness part N° 82 00 344 391
- Pump to PTO adaptation kit (**3**) – consult PTO manufacturer
- Control switch part N° 82 00 214 766

Installation on gearbox
Drain the oil from the gearbox.
Remove the gearbox closing plate.
Carefully clean the joint face.
Screw studs (**A**) into the gearbox casing and tighten at a torque of 13 ± 2 Nm.
Install gasket (**B**), PTO, washers (**C**) and nuts (**D**).
Tighten the nuts (**D**) at a torque of 39 ± 6 Nm.
Fill the gearbox with oil: consult the driving and servicing handbook.


A
B
C
D
1
2
3
60 2953A

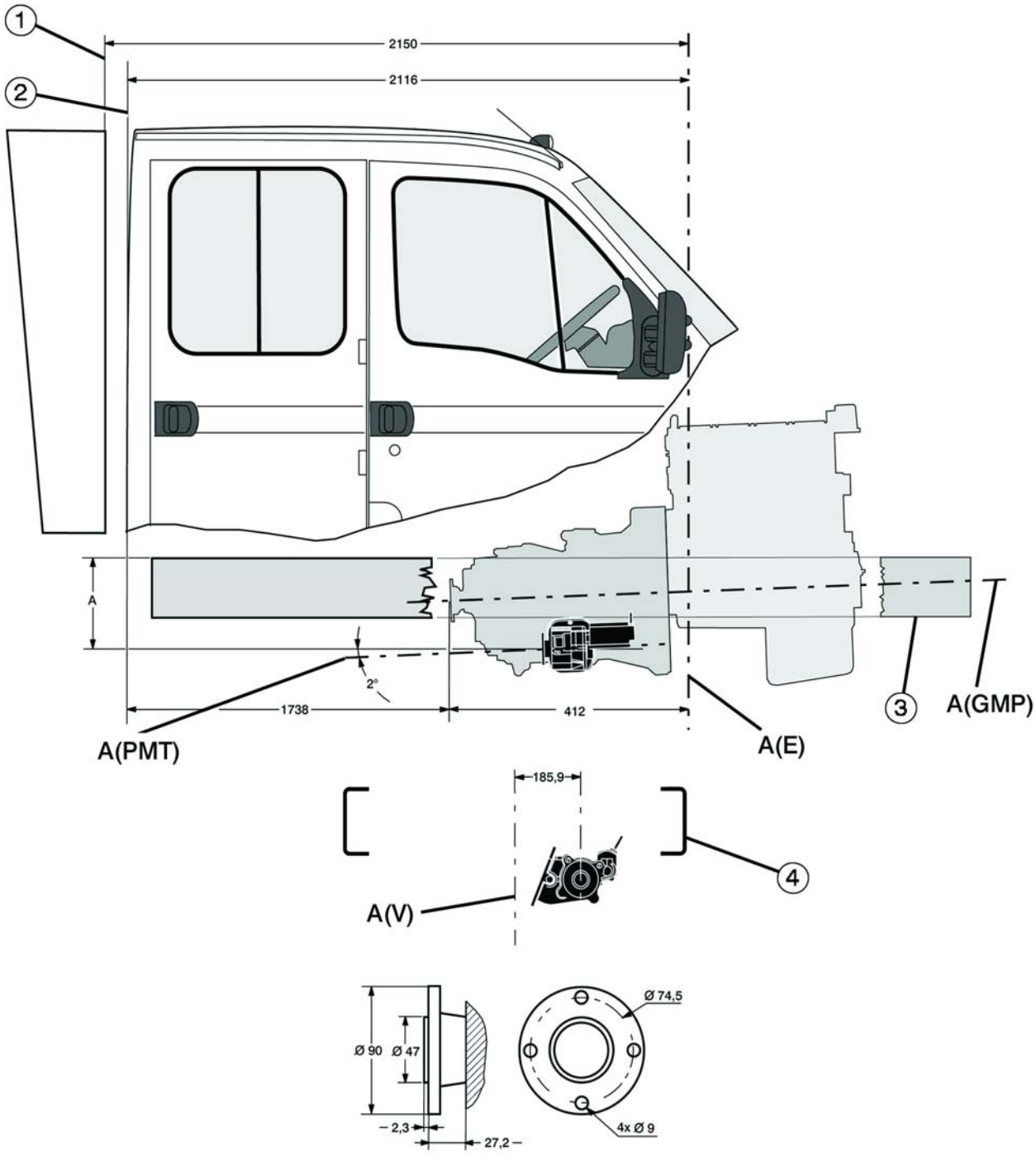
Assembly of Hydrocar PTO 22Z1 to ZF 5 S 270 gearbox
Single cab
A – 241.4 mm for sidemember thickness 4 mm, 242.4 mm for sidemember thickness 5 mm
Dimensions in mm (tolerance: ± 2 mm)

1 - Body start with single cab
2 - Single cab rear end
3 & 4 - Right-hand sidemember
A (E) - Front axle centre-line
A (V) - Vehicle centre-line
A (GMP) - Engine centre-line
A (PMT) - PTO centre-line



Assembly of Hydrocar PTO 22Z1 to ZF 5 S 270 gearbox
Double cab
A – 241.4 mm for sidemember thickness 4 mm, 242.4 mm for sidemember thickness 5 mm
Dimensions in mm (tolerance: ± 2 mm)

1 - Body start with double cab
2 - Double cab rear end
3 & 4 - Right-hand sidemember
A (E) - Front axle centre-line
A (V) - Vehicle centre-line
A (GMP) - Engine centre-line
A (PMT) - PTO centre-line



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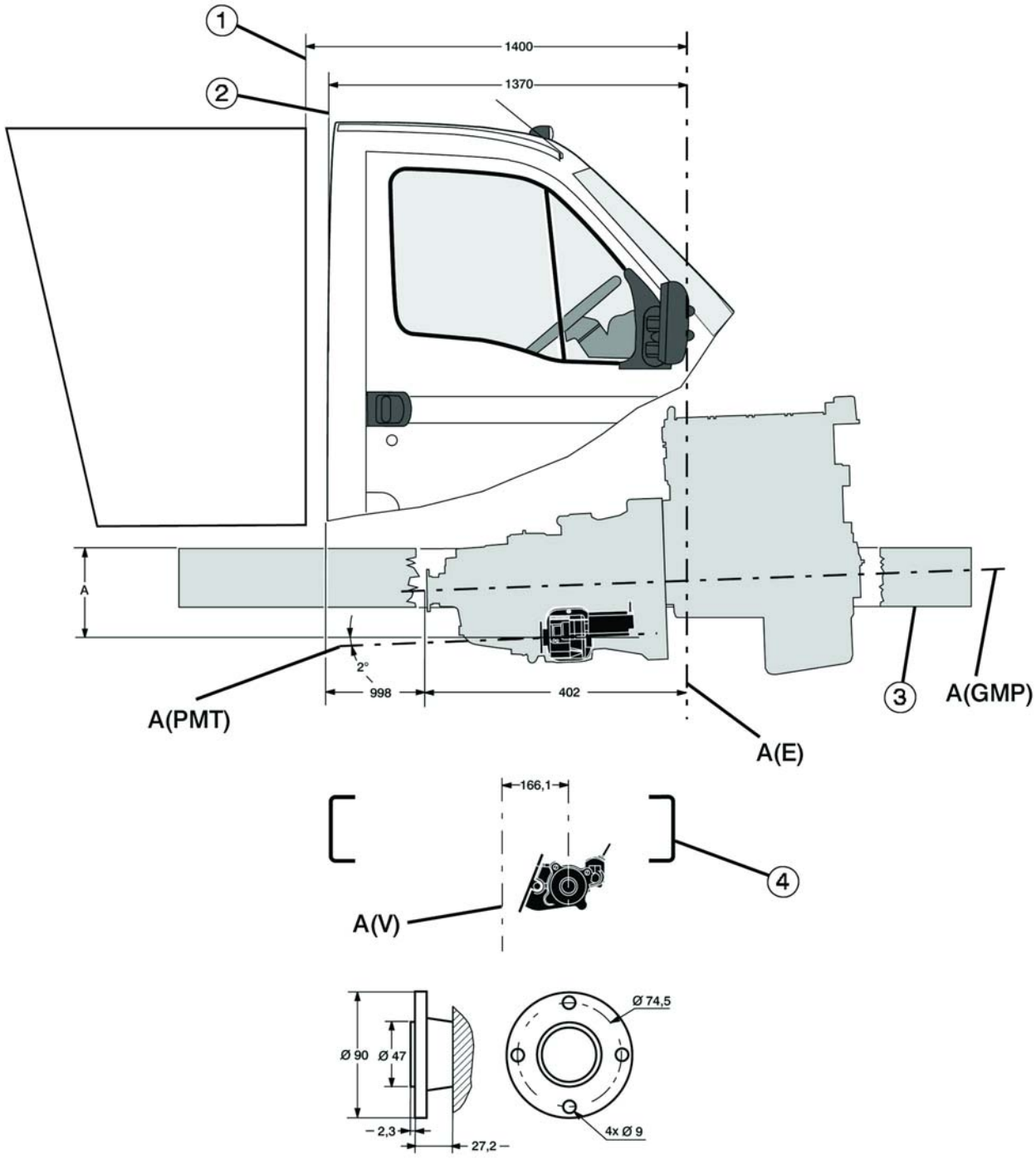
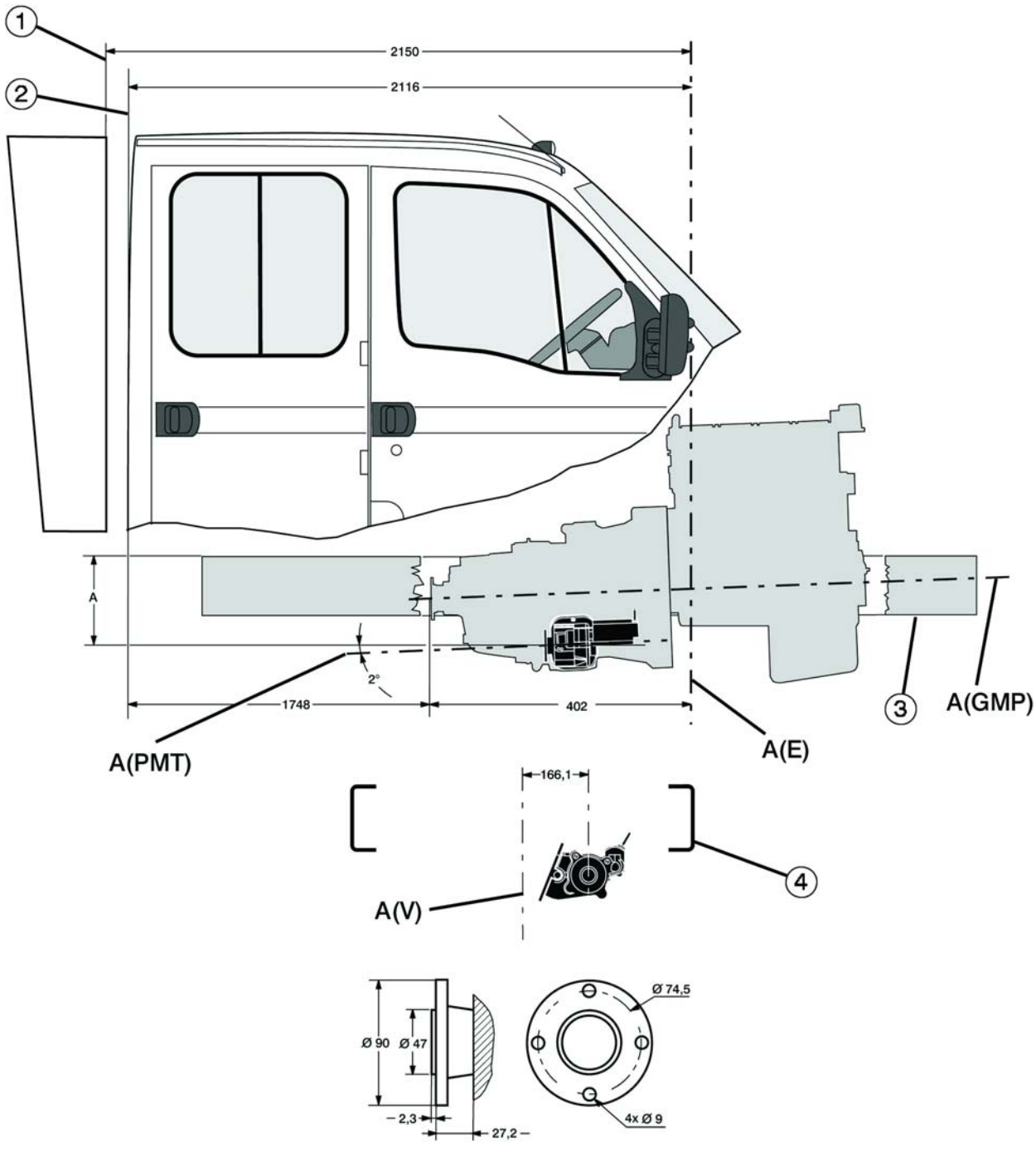
Assembly of Hydrocar PTO 22Z2 to ZF 6 S 350 gearbox
Single cab
A – 241.4 mm for sidemember thickness 4 mm, 242.4 mm for sidemember thickness 5 mm
Dimensions in mm (tolerance: ± 2 mm)

1 - Body start with single cab
2 - Single cab rear end
3 & 4 - Right-hand sidemember
A (E) - Front axle centre-line
A (V) - Vehicle centre-line
A (GMP) - Engine centre-line
A (PMT) - PTO centre-line



Assembly of Hydrocar PTO 22Z2 to ZF 6 S 350 gearbox
Double cab
A – 241.4 mm for sidemember thickness 4 mm, 242.4 mm for sidemember thickness 5 mm
Dimensions in mm (tolerance: ± 2 mm)

1 - Body start with double cab
2 - Double cab rear end
3 & 4 - Right-hand sidemember
A (E) - Front axle centre-line
A (V) - Vehicle centre-line
A (GMP) - Engine centre-line
A (PMT) - PTO centre-line



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2. MODIFICATIONS TO THE REAR OVERHANG

2.1 Intermediate cross-member

If the bodywork or fitted equipment do not modify the chassis weight and dimensions entered in the descriptive notice, the vehicle can be presented to the Type Approval department without intervention from RENAULT TRUCKS (within the permitted limits in force).

- Weld reinforcements are demanded for drawbar rigids or if the extension is more than 400 mm for solo rigids (e.g. drawbar rigid, tail lift, behind-cab crane, tipper, etc...).
- Extension of the rear overhang is likewise demanded when the rear extremities of the bodywork protrude more than 280 mm past the rear run-under guard.
- Overhang limit values:
  Minimum: 845 mm
  Maximum: refer to the calculation sheets and determine the maximum overhang by calculation on the basis of the maximum body length and the position of the run-under guard.

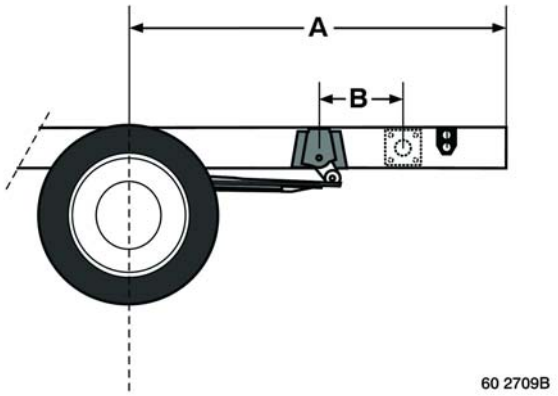
For welding, comply with the recommendations described in the chapter “Extension, shortening of sidemembers in the wheelbase”.

If, after extension:

2050 < A < 2550 mm:

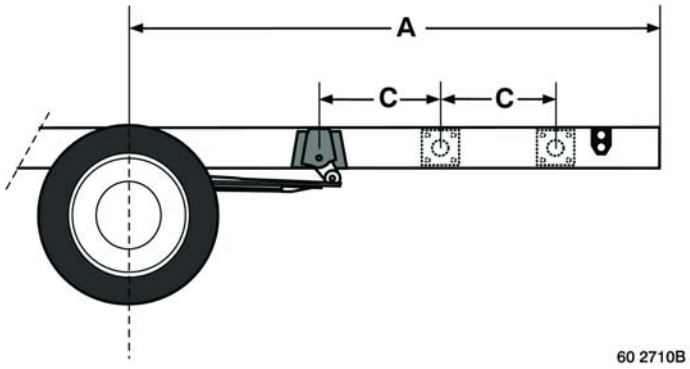
The chassis must be fitted with a cross-member to the rear of the rearmost suspension spring hanger cross-member.

The distance (**B**) should not exceed 940 mm.



A > 2550 mm:

The chassis must be fitted with 2 cross-members with maximum pitch (**C**) 740 mm to the rear of the rear-most suspension spring hanger cross-member.



Procurement:

- 1 or 2 cross-members part N° 50 10 382 622
- 8 hexagon collar bolts HM10 x 125 x 30 - class 10.9 per cross-member
- 8 flanged (DRH) nuts M10 x 125 - class 10 per cross-member
- 16 plain washers 10 x 22 x 3 to be placed under the nuts.

For threaded hardware, refer to chapter “Nuts and bolts and tightening torques for parts in steel and cast iron”.

The use of nuts with nylon ring (e.g. Nyloc) is forbidden.

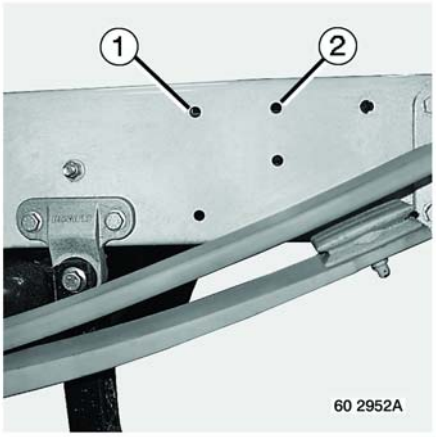
Note:

Chassis:

- with wheelbase 3630 mm and rear overhang 1185 and 1380 mm are pre-arranged for a rear overhang reduction to 845 mm.
- with wheelbase 4130 mm and rear overhang 1780 mm are pre-arranged for a rear overhang reduction to 1035 mm.

The sidemembers are punched for repositioning of the chassis components without modification:

- position of rear lighting bar bracket (**1**),
- position of last body bracket (**2**).



2.2 Rear cross-member and drawbar cross-member

2.2.1 Rigidification of the chassis

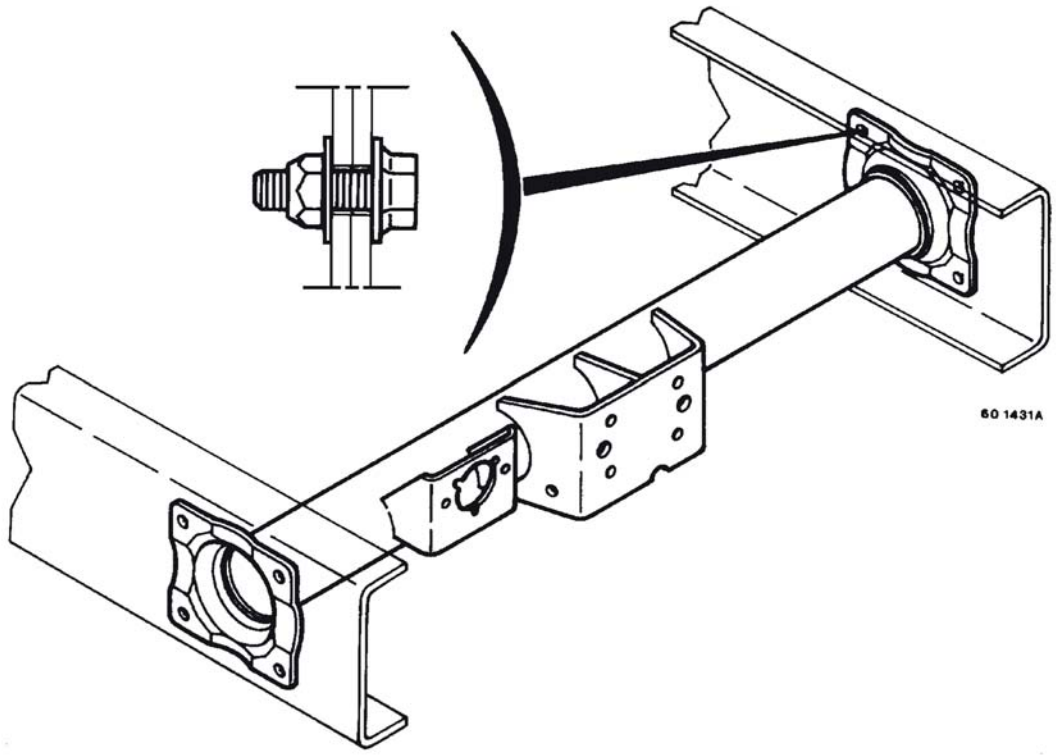
In the event of the vehicle not being equipped with a towing device, it is essential to mount a rear cross-member when the rear part of the sidemembers is submitted to high forces.

Examples: tail lift, tipper chassis, breakdown vehicle, buffers...

The rear cross-member can be either a towing cross-member or an intermediate cross-member. It is to be positioned as close as possible to the area of application of the forces.

2.2.2 Drawbar cross-member

In the event of installation of a trailer signalling device, replace the original flasher unit part N° 77 00 377 037 by a flasher unit part N° 77 00 377 199.



Procurement

For all vehicles except cases quoted in (B):

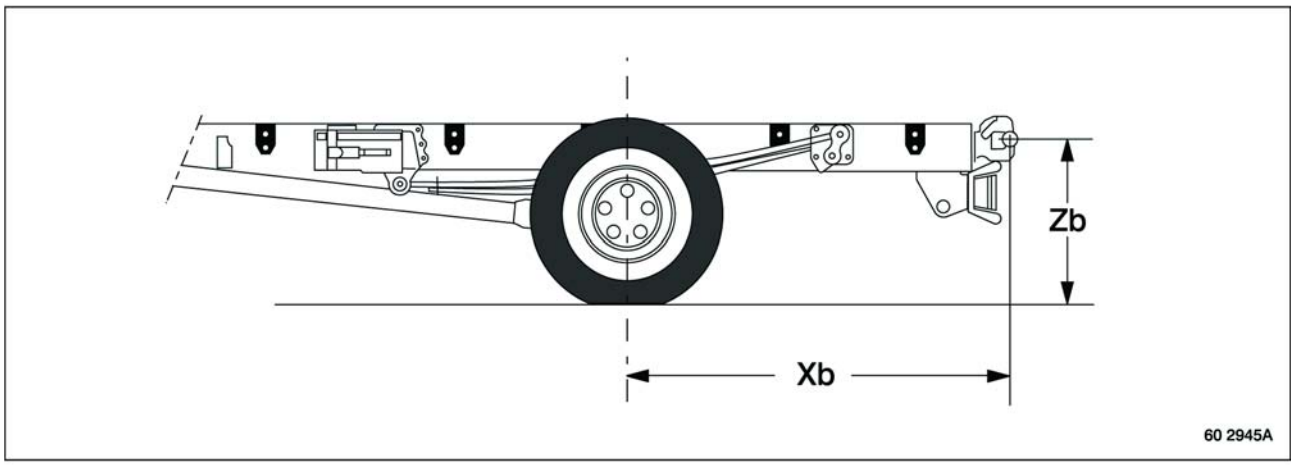
- 1 towing cross-member part N° 50 10 382 335 or intermediate cross-member part N° 50 10 382 622
- 8 hexagon collar bolts HM10 x 125 x 30 - class 10.9
- 8 flanged DRH nuts M10 x 125 - class 10
- 16 plain washers 10 x 22 x 3 to be placed under the nuts.

- Towing ball-hook part N° 50 10 236 734
- 1 trailer socket wiring harness part N° 77 00 377 122
- Flasher unit part N° 77 00 377 199.

For threaded hardware, refer to chapter “Nuts and bolts and tightening torques for parts in steel and cast iron”.

The use of nuts with nylon ring (e.g. Nyloc) is forbidden.

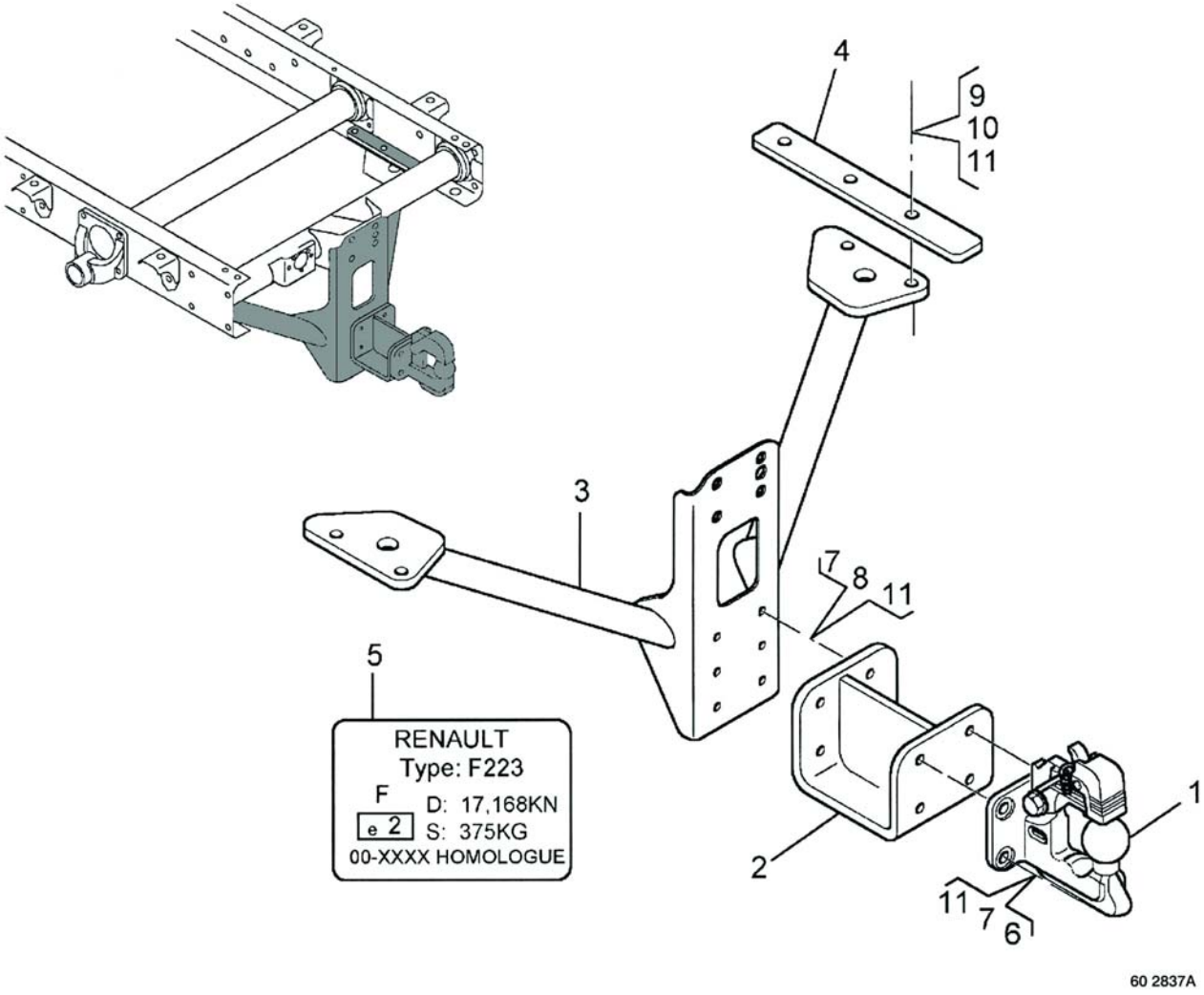
Hitching positions



				Zb ± 25	
GVW	**Wheelbase**	**Overhang**	**Xb**	**max.**	**min.**
5.0 tonnes	3130	1090	1230	727	593
	3630	845	985	724	598
	3630	1380	1520	736	596
	4130	1780	1920	740	599
	4630	1340	1480	731	602
5.5 tonnes	3130	1090	1230	740	631
	3630	845	985	732	629
	3630	1185	1325	741	631
	4130	1035	1175	734	629
	4130	1780	1920	749	633
	4630	1340	1480	738	630
6.5 tonnes	3130	1090	1230	746	617
	3630	845	985	740	616
	3630	1185	1325	749	616
	4130	1780	1920	756	617
	4630	1340	1480	745	616

GVW = Plated Gross Vehicle Weight

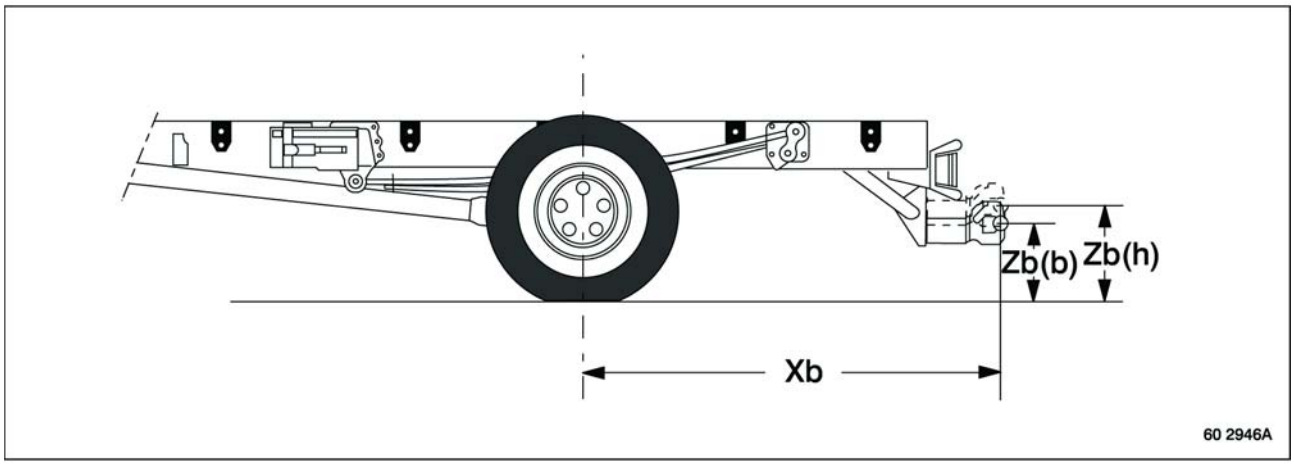
2.2.3 Assembly of dropped hook



Tightening torque: 62 Nm ± 20%

Item	Designation	Part N°	Quantity
1	Hook	50 10 537 484	1
2	Bracket	50 10 580 132	1
3	Hitch	50 10 537 387	1
4	Reinforcement	50 10 537 984	2
5	Identification plate	50 10 505 727	1
6	Socket hexagon bolt	50 00 820 966	4
7	Taper washer	77 03 058 132	8
8	Hexagon bolt	50 03 002 049	4
9	Hexagon bolt	50 10 571 489	10
10	Plain washer	50 03 053 453	10
11	Locknut	50 03 034 246	18

Hitching positions



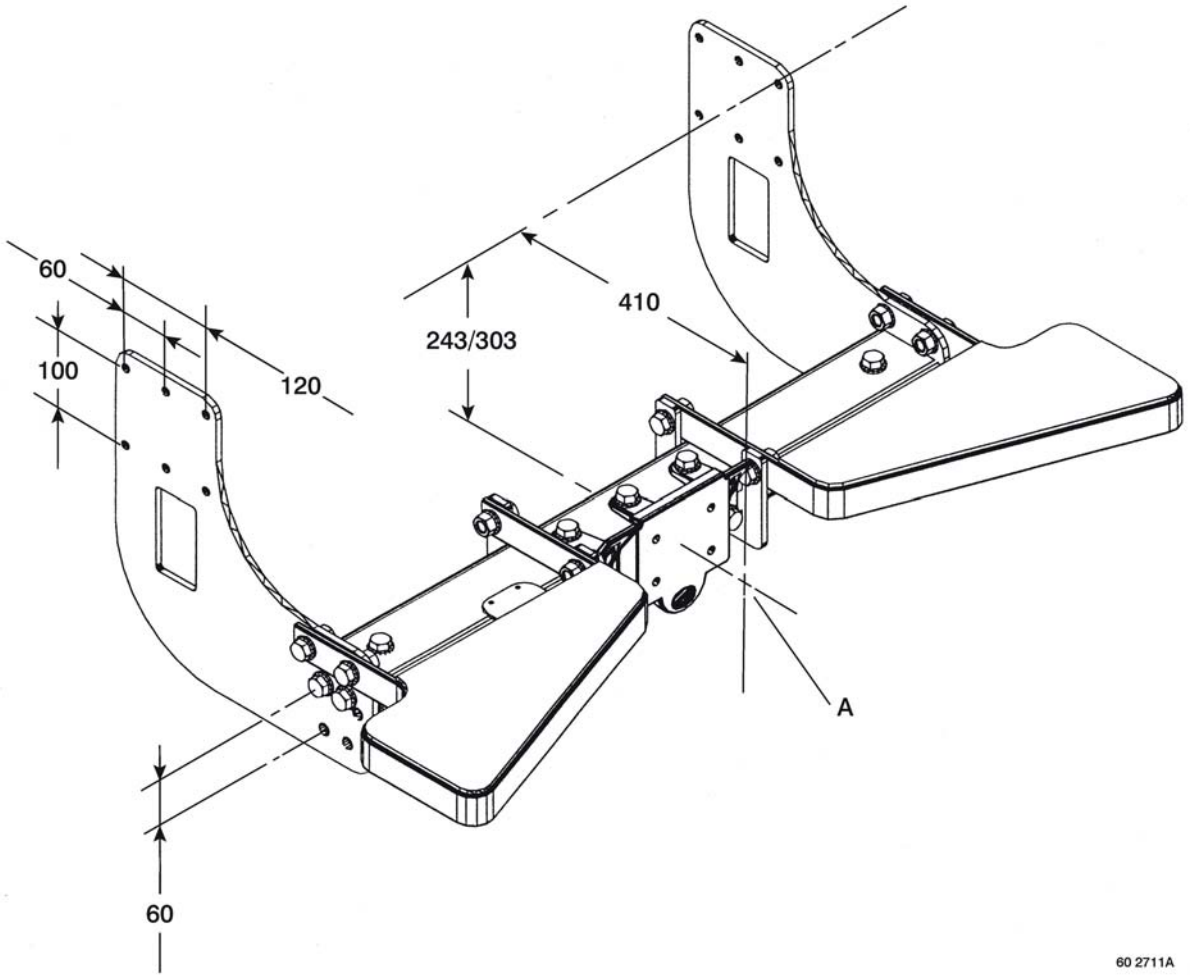
				Zb ± 25		Hook position
GVW	**Wheelbase**	**Overhang**	**Xb**	**max.**	**min.**	
3.5 tonnes dropped suspension all cabs	3130	1090	1390	483	367	High
	3630	845	1145	471	375	
	3630	1380	1680	487	365	
	4130	1780	2080	485	380	
	4630	1340	1640	474	375	
3.5 tonnes normal suspension single cab	3130	1090	1230	457	380	High
	3630	845	1145	464	385	
	3630	1380	1680	465	378	
	4130	1780	2080	466	390	
	4630	1340	1640	455	387	
3.5 tonnes normal suspension double cab	3630	845	1145	407	360	Low
	3630	1185	1485	417	369	
	3630	1380	1680	422	373	
	4130	1035	1335	410	366	
	4130	1780	2080	425	378	
	4630	1340	1640	415	373	
3.5 tonnes downrated all cabs	3130	1090	1390	438	396	Low
	3630	845	1145	430	390	
	3630	1185	1485	435	399	
	4130	1780	2080	446	407	
	4630	1340	1640	436	400	

GVW = Plated Gross Vehicle Weight

2.2.4 Drawbar cross-member on van

A drawbar cross-member is specific for van vehicles with 3.5 tonnes capacity, towing up to 3 tonnes (available from the Spare Parts Department).

To assemble this kit, contact the RENAULT TRUCKS Product Applications Department.



A – Towing hook ball centre-line.

3. CHANGING THE POSITION OF EQUIPMENT ON CHASSIS

3.1 Changing the position of equipment

3.1.1 Rear run-under guard

RENAULT TRUCKS gets type approval for devices covering the needs of its range. Their bolted fastenings allow the position of the devices to be changed along the sidemembers depending on any modification that chassis may undergo, with maintaining of the original fastening method indicated in the 1:20th scale bodywork drawing and observance of regulatory dimensional requirements.

A vehicle that is not equipped upon delivery can be fitted with equipment subsequent to conversion work rendering the equipment compulsory, on the basis of components supplied by our dealers' spare parts stores.

Dimensions **B**, **D** and **E** are to be adhered to without fail.

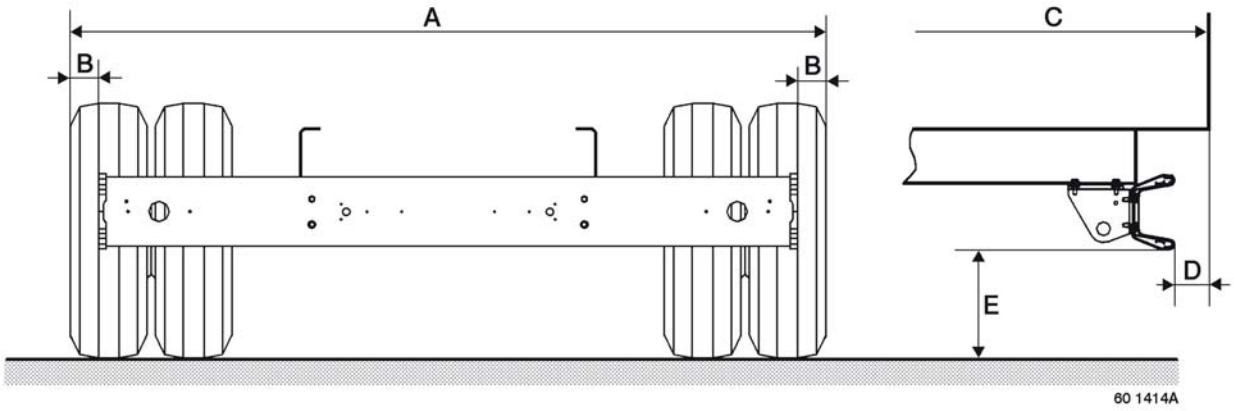
A - Axle overall width

B - Protrusion of tyre past run-under guard (< 100 mm)

C - Vehicle overall rear protrusion

D - Maximum distance separating rear run-under guard from the overall rear of any of the body (280 mm for chassis cabs and 380 mm for vans)

E - Maximum height, unladen, of run-under guard (550 mm max.)



3.1.2 Side impact beams

The equipment manufacturer should, if need be, equip the vehicle with side impact beams meeting the regulation standards in force.

3.1.3 Lateral rearview mirrors

Two types of rearview mirrors are available and accommodate 2 overall body widths (2200 and 2300 mm). They are interchangeable. Depending on the vehicle, they can be of the heated and remote adjustment type.

4. ASSEMBLY OF EQUIPMENT TO CAB

4.1 Roof cut-out

4.1.1 Method

Remove the cab overhead lamp.

Remove the cab interior headlining.

Remove the overhead lamp bracket.

Insulate the roof lamp wiring harness connectors and lash the wiring harness to the roof cross-member.

After cutting out, deburr and provide protection against corrosion using a zinc aerosol spray (available from the Spare Parts department part N° 77 01 406 425).

4.1.2 Roof maximum cut-out zone

The maximum cut-out zone (**D**) of the roof (**1**) is limited:

- to the front, by the roof front cross-member (**2**),
- to the rear, by the roof rear cross-member (**3**),
- sideways, by the sides of the assembled cab (**4**).

While cutting out, take care not to damage:

- the wiring harness routed at the front and on the sides of the roof,
- the rear cross-member of the roof at the level of the roof lamp bracket fastening.

Do not modify, under any circumstance, the roof cross-members and the cab pillar reinforcements.

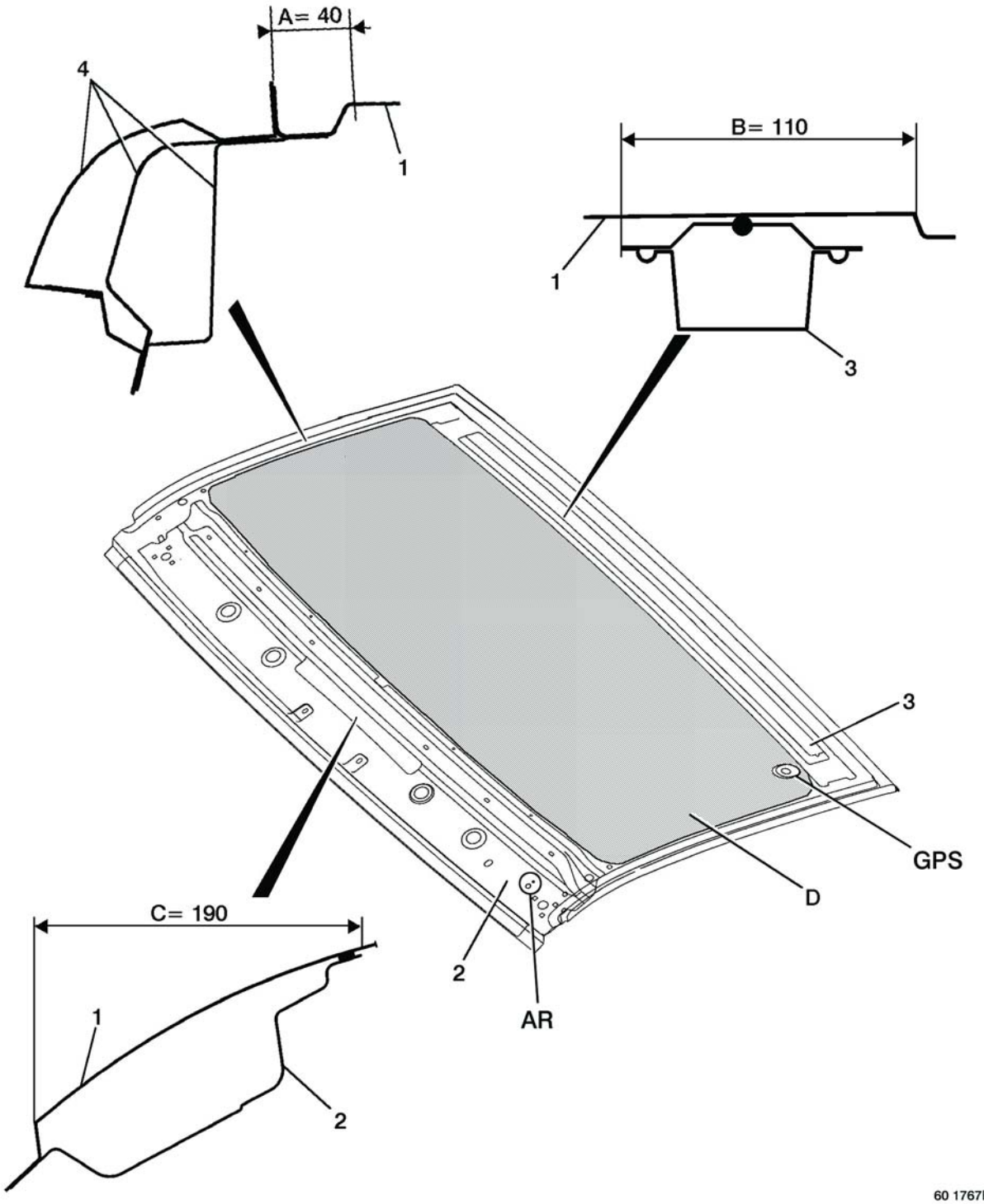
A - Distance between maximum cut-out zone and side extremity of the roof.

B - Distance between the maximum cut-out zone and the rear rib of the roof.

C - Distance between the maximum cut-out zone and the windscreen framing rib of the roof.

AR – Pre-arrangement for radio antenna

GPS – Pre-arrangement for GPS


A= 40
4
1
B= 110
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5. AIRBAG

Depending on your vehicle's equipment

IMPORTANT
The fitting of a bull-bar or any other equipment (winch, etc…) on the front end of the vehicle that might rigidify the chassis is strictly forbidden if an airbag is fitted.

IMPORTANT
Any work on the airbag system must be carried out by qualified personnel who have undergone suitable training.

5.1 Identification of a vehicle equipped with an airbag system

A vehicle equipped with a driver's airbag can be identified by:

- the inscription "airbag" in the middle of the steering wheel.
- a sticker placed in the bottom corner of the windscreen, on the driver's side. (If the windscreen has to be replaced, affix a new sticker in the bottom corner of the new windscreen, on the driver's side).

5.2 Work on the vehicle (excluding the airbag) requiring precautions to be taken to avoid inadvertent deployment of the airbag

During repair or adaptation work, the vehicle is not to undergo significant knocks (hammer blows...) nor is welding work to be undertaken without previously disconnecting the battery and waiting for a period of 5 minutes.

No electrical accessories should be installed, as aftermarket fitment, within the close surrounds of an airbag (loudspeaker or any other appliance generating a magnetic field might cause the airbag to release).

Before removing the steering wheel, it is essential to unplug the airbag module connector so as to avoid any damage.

In the event of any work requiring uncoupling of the steering box universal joint, the roadwheels must be in the straight ahead position and the steering wheel must be immobilized, in order to keep to the mid-point of the rotary switch.

IMPORTANT
- If an airbag system is fitted, the seat belt must be worn.
- If the driver's seat (or bench seat) designed for the airbag system has to be changed, it must be replaced by a seat identical to the one originally fitted.
- Adjust the seat cushion and squab correctly so that the airbag offers optimum protection.
- The protective cover must be free from any article (ledge, clock, adhesive, various accessories...).
- There should be no objects within the airbag deployment area (dia. 100 cm).
- Do not place anything between the dashboard and the passenger(s).
- Do not place your legs on the dashboard or on the seat, as such postures risk causing serious injury. Generally speaking, keep all parts of your body (knees, hands, head...) away from the dashboard.
- To avoid any inadvertent deployment of the airbag capable of causing bodily injury, it is forbidden to remove the steering wheel or work on the airbag system.
Only the RENAULT TRUCKS network is qualified to work on the airbag system.
- Get the airbag system checked out in the case of accident or if there has been attempted theft of or from the vehicle.
- For safety reasons, replace the airbag and the pretensioner(s) every 10 years.
- If water is splashed onto or gets into the electronic box located under the driver's seat, replace the box.
- Any significant modification to the front end of the vehicle or any overloading of the vehicle may lead to inadvertent release of the airbag system.
- When lending or reselling the vehicle, inform the borrower or purchaser of all these conditions. Get him to read the driving and servicing handbook.