**DT 3/364 AN**
**english version**

# Guide for the Fitting of Bodywork for the RENAULT MASCOTT

**50 21 008 644 - 07/02**
**édition anglaise**

***IMPORTANT***

***Reading the "Guide for the Fitting of Bodywork for the RENAULT MASCOTT"***

*The "Guide for the Fitting of Bodywork for the RENAULT MASCOTT" ushers in a new type of presentation for bodywork fitting guides.*

*This new presentation sets out in one single document all those details that are necessary for the bodybuilder and equipment manufacturer to have available.*

*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 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 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", "Specific 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.**

**RENAULT V.I.** S.A. au capital de 50 000 000 €.
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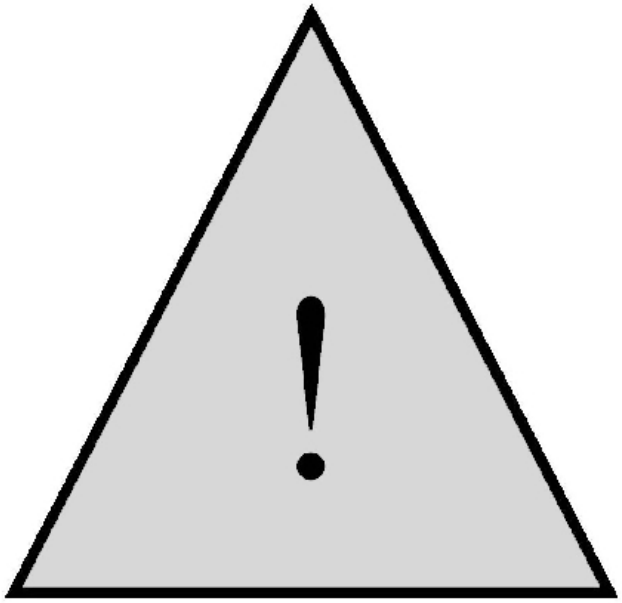
**Carrossiers & Equipementiers**
**ATTENTION**
véhicule électronisé EURO3
Respecter IMPERATIVEMENT
les consignes de carrossage
ou
Contacter le constructeur



**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
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Contattare il costruttore

**RENAULT**

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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 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.

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## 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:**

- Lighting and signalling,
- Weight and dimensions,
- The field of vision and rear view,
- The regulation protection devices (e.g. side guards, anti-spray, run-under guard),
- The 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:

- The control of the driver of the trajectory and the ability to stop the vehicle and its trailer,
- The load distribution on the front or the rear, the left or the right,
- The risk of fire,
- and any other risk for the vehicle and its surrounding environment.

**Among the components, we would mention, among others:**

- The cab tilt mechanism,
- The wheels (tightening of the nuts),
- Seats and seat belts (anchorage points),
- The 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),
- The 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 axle housing assemblies,
- The air-bag system and pretensioning systems on the seat belts,
- The electronics.

## 1.4 Quality assurance

Our permanent objective is to give satisfaction to our customers and we must achieve this in full on the final 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:

- The conformity with all legislation, EC Directives and national regulations,
- The compliance with the manufacturers' directions,
- The 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 requirements and 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 (i.e. take care to allow for snow chains; extra clearance must be provided).
- Ventilation of the brake drums and discs and the battery compartment.
- The 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).

On the 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 |
|---|---|---|---|
| **6 Volt battery** | **12 Volt battery** | | |
| 6.3 Volts | 12.7 Volts | 1,27 | 100 % |
| 6.2 Volts | 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 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 seating 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 Safety on tilt cabs

After the conversion of standard cabs by the bodybuilders, (i.e. extension, bunk adaptation, over-cab extension, etc.) because the weight distribution has changed, the tilt system may no longer meet the requirements of the safety standards.

Under these circumstances, and without prior agreement from the manufacturer, the full and entire responsibility rests with the bodybuilder.

## 1.8 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.

## 1.9 Adjustments to the vehicle settings

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

## 1.10 Cleaning

### 1.10.1 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.

### 1.10.2 Chassis/Underbodies

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,
- the fuel gauge.

### 1.10.3 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.

### 1.10.4 Cleaning of the instrument panel

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

## 1.11 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),
- The bags for the air suspension,
- The 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”.

## 1.12 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.

The lateral imbalance of the loads should not exceed a maximum of 4% between the LH and RH roadwheel of each axle.

**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 (excluding fittings and accessories).

In the case of vehicles with 3 or 4 axles: distance between the centre-line of the rearmost axle and the extremity of the chassis.

**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).

In the case of vehicles with 3 or 4 axles: distance between the technical centre-line of the tandem and the rear extremity of the body.

**Wheelbase** (Dimension F or F' on technical data sheets).

Distance between the centre-lines of the front and rear roadwheels (vehicle laden).

In the case of vehicles with 3 or 4 axles: distance between the centre-line of the front roadwheels and the centre-line of the foremost rear axle - for calculations take dimension F' (technical wheelbase).

**Tandem**

Solely in the case of vehicles with 3 or 4 axles: the 2 rear axles taken together, regardless of whether they are driving axles or trailing axles.

**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**

The weight of the driver and passenger (passengers) in the cab is applied to the front axle in the case of a forward control cab.

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 specifications into account.

## 1.13 Certificate of approval of the conversion of a vehicle

### 1.13.1 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.

### 1.13.2 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.

### 1.13.3 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.

## 1.14 Painting

### 1.14.1 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 more **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:

### 1.14.2 **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.

## 1.14.3 Chassis frame and accessories (sidemembers, cross-members, fittings, lockers, etc.)

Works paint: POLYURETHANE or POLYESTER powder.

**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 for attaching tail lifts and accessories) due to drilling.

- 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.

Since August 1999, the chassis are painted grey as replacement for Enduro red. For paint retouches on grey chassis, use a grey paint aerosol ref. N° 50 01 848 147.

## 1.14.4 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<br>“EPOXY” hardener<br>“EPOXY” thinner<br>“EPOXY” slow thinner<br>thinner 2KS | 50 01 826 019<br>50 01 825 990<br>50 01 826 005<br>50 01 829 256<br>50 01 825 992 | FA 931 5203<br>FA 931 5204<br>FA 931 5205<br>FA 931 5213<br>FA 020 7810 |
| **ICI AUTOCOLOUR** | “EPOXY” filler-sealer<br>“EPOXY” hardener<br>thinner | 50 01 829 477<br>50 01 829 480<br>50 01 829 481 | P580–2100<br>P210—833<br>P850–3091 |

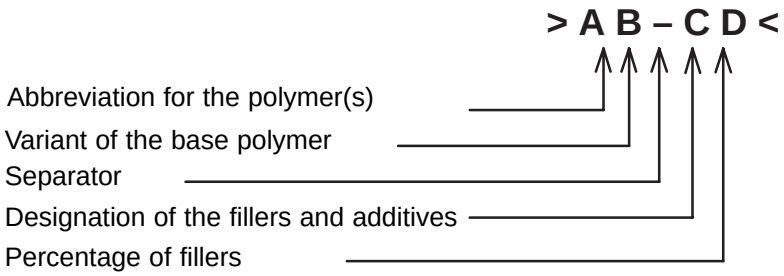
**Finish paint**

Two-component polyurethane paint and corresponding thinner.

## 1.14.5 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(oxide of propylene) |
| 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 |

## 1.15 Electrical equipment

### 1.15.1 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 (if not, refer to the recommendations of the manufacturer CIC 1081). 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.

### 1.15.2 Wiring harnesses

- 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 must be protected by a sealed sheath (smooth and thick or ringed) and 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.
- 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 route a wiring harness over projecting angles.
- Never attach a wiring harness to moving parts (even slight movement).
- 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 amperes per $mm^2$).
- The length of the wiring harnesses should be long enough to allow the electrical appliance which is connected to be taken off (i.e. principal display unit, tachograph, etc.).
- 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.

## 1.15.3 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 strictly 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.
  - 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 auxiliary 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.).

## 1.15.4 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).

## 1.15.5 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.

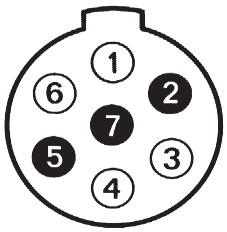
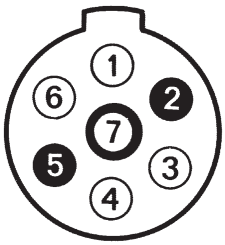
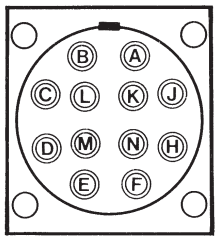
The flasher units are designed for a maximum rating which is marked on the unit.

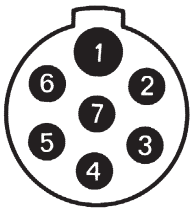
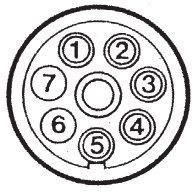
Do not exceed this power rating.

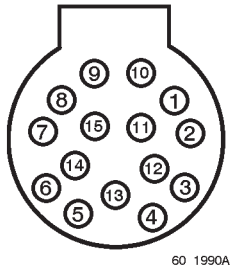
**Connection**

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.

## 1.15.6 List of standard power sockets

| SUPPLY VOLTAGE | DESCRIPTION AND STANDARDS | SOCKET DIAGRAM (front view) |
|---|---|---|
| 12 Volts | 12 N type socket<br>(Standard: - BNA.R.43.407 dated April 1982<br>- ISO 1724).<br>1 - LH direction indicator lamp.<br>2 - Rear fog lamp.<br>3 - Earth.<br>4 - RH direction indicator lamp.<br>5 - RH rear side and marker lamp and number plate illumination lamp.<br>6 - Stop lamp.<br>7 - LH rear side and marker lamp and number plate illumination lamp. |  <br>600037 |
| 12 Volts | 12 S type socket<br>(Standard: - BNA.R.43.410 dated August 1982<br>- ISO 3732).<br>This is a supplementary socket which is assembled in addition to the 12 N socket.<br>1 - Reversing lamp.<br>2 - Not allocated.<br>3 - Earth.<br>4 - Supplementary + power supply.<br>5 - Earthing monitor.<br>6 - Positive (+) power supply.<br>7 - Not allocated. |  <br>600038 |
| 24 Volts | 12-pin socket<br>(Standard: - BNA.R.43.405 dated March 1961<br>- DEFA 1457 b<br>- DCEA 5.556<br>- NATO).<br>A - LH black-out side lamp.<br>B - LH direction indicator lamps.<br>C - RH black-out side lamp.<br>D - Earth<br>E - Rear side and marker lamps and number plate illumination lamp.<br>F - Black-out stop lamp.<br>H - Not allocated.<br>J - RH direction indicator lamps.<br>K - Battery + power supply.<br>L - Earth.<br>M - Stop lamps.<br>N - Not allocated |  |

| SUPPLY VOLTAGE | DESCRIPTION AND STANDARDS | SOCKET DIAGRAM (front view) |
|---|---|---|
| 24 Volts | 24 N type socket<br>(Standard: - BNA.R43.406 dated January 1976<br>- ISO 1185).<br>1 - Earth.<br>2 - LH rear side and marker lamp and number plate illumination lamp.<br>3 - LH direction indicator lamps.<br>4 - Trailer stop lamps.<br>5 - RH direction indicator lamps.<br>6 - RH rear side and marker lamps and number plate illumination lamp.<br>7 - Available.<br><br>Terminal 7 is scheduled in certain countries for supplying power to regulation trailer brakes. |  <br>600040 |
| 24 Volts | 24 S type socket<br>(Standard: - BNA.R43.409 dated April 1982<br>- ISO 3731).<br>This is a supplementary socket which is assembled in addition to the 24 N socket.<br>1 - Earth.<br>2 - Not allocated.<br>3 - Reversing lamp.<br>4 - Power supply.<br>5 - Earthing monitor.<br>6 - Supplementary power supply.<br>7 - Rear fog lamp. |  <br>600041 |
| 24 Volts | 24 P (oil tanker) type socket<br>(Standard: - BNA.R.10.120 dated June 1977)<br>This is the socket for ADR (Transport of Hazardous Substances) vehicles which is assembled in addition to the 24 N socket.<br>1 - Earth.<br>2 - Valve lighting.<br>3 - Reversing lamp.<br>4 - Positive (+) power supply.<br>5 - Insulated earth.<br>6 - Not allocated.<br>7 - Rear fog lamp. |  <br>600042 |
| 24 Volts | ABS specific type socket<br>(Standard: - ISO 7638)<br>1 - Power (30A).<br>2 - Control power supply (2A).<br>3 - Control earth (2A).<br>4 - Power earth (30A).<br>5 - Information (2A).<br>6 - Free.<br>7 - Free. |  <br>600563 |

| SUPPLY VOLTAGE | DESCRIPTION AND STANDARDS | SOCKET DIAGRAM (front view) |
|---|---|---|
| 24 Volts | 15-pin trailer socket<br>(Standard: - ADR 1999 IP54 and anti-unhooking<br>- ISO 12098).<br>1 - LH direction indicator lamps<br>2 - RH direction indicator lamps<br>3 - Rear fog lamp<br>4 - Earth<br>5 - RH rear side/parking and marker and registration plate lamps<br>6 - LH rear side/parking and marker and registration plate lamps<br>7 - Stop lamps<br>8 - Reversing lamps<br>9 - 24V positive (+) power supply<br><br>Since July 1999, the 15-way socket replaces 24N and 24P sockets.<br>Channels 10, 11, 12, 13, 14, 15 are unaffected. |  <br>60 1990A |

The 15-way socket can be mounted on vehicles equipped with 24N and 24P sockets with the use of a 15-way 24N/24P adapter ref. N° 50 01 851 060 available from the RENAULT TRUCKS Spare Parts Department.

## 1.15.7 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 RH side and the other for the LH 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 the vehicle 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.

## 1.16 Air-operated equipment

Should it be necessary to add auxiliary equipment not provided by the manufacturer, it must compulsorily be connected to the circuit specifically provided for auxiliary equipment on the vehicle.

The compressed air consumption of such auxiliary equipment should under no circumstances compromise the filling times of the brake circuits laid down by the legislation in force.

The RENAULT TRUCKS Product Applications Department is at your disposal for any further information you may require.

### 1.16.1 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.

### 1.16.2 Polyamide pipes

**Identification marking**

Before removing any equipment or disconnecting polyamide pipes, mark the pipe in relation to the connection port on the equipment.

**Coding system used on polyamide pipes (RENAULT TRUCKS standard):**

Polyamide pipes are identified with a colour code marked with adhesive tape or by elastic rings.

**Brakes code :**

| Main functions | Sub-functions | | |
|---|---|---|---|
| | Constant pressure | Delivered pressure | Signalling pressure |
| Front service brake | Orange | Orange - White | Orange - Yellow |
| Rear service brake | Blue | Blue - White | Blue - Yellow |
| Parking brake | Green | Green - White | Green - Yellow |
| Trailer brake | Red | Red - White | Red - Yellow |
| Extra brake | Yellow | Yellow - White | Yellow - Yellow |

**Coding system used on pneumatic appliances (DIN standard)**

| | | |
|---|---|---|
| 0 - Air intake | 5 - Free | |
| 1 - Pressurized supply | 6 - Free | |
| 2 - Delivered pressure | 7 - Antifreeze | |
| 3 - Air vent | 8 - LubricatIon. | 81 - Inlet 82 - Outlet |
| 4 - Signalling pressure | 9 - Water cooling | 91 - Inlet 92 - Outlet |

When the figure is followed by a second figure, the latter figure indicates the sequence number.

Example: 41, 42, 43: The figure 4 indicates the signalling function, the figures 1, 2, 3 indicate a sequence number in that function.

**Replacement of a brake line**

The entire length of a damaged polyamide pipe should be replaced by a pipe with identical characteristics (length and diameter), and corresponding with the standard in force. (See technical memo 8655 group 53000, available with spare parts). It must also be provided with coloured rings which are identical to those of the tube replaced.

Use an original manufacturer's pipe available from the RENAULT TRUCKS Spare Parts Warehouse.

The routing of a polyamide pipe must be carefully executed. Ensure there is no interference with sharp-edged metal parts and there is no routing close to high temperature units. The pipes must be held at regular intervals by plasticized clamps or run in existing ducting. Non-plasticized attachment clamps are absolutely forbidden. Take care to ensure the minimum radius of curvature of polyamide pipes is observed.

| Dimension | 4 x 6 | 6 x 8 | 9 x 12 | 12 x 16 |
|---|---|---|---|---|
| Radius of curvature | 30 mm | 50 mm | 70 mm | 130 mm |

**Modification to the length of the chassis**

Modification to brake pipe lengths requires braking response times to be checked out, in accordance with the legislation in force, and with agreement from the Type Approvals Department.

**Connections for firtree type pneumatic brake pipes type "RILAX 2000"**

For the fitting of this type of connector, refer to and comply absolutely with the technical instruction sheet NT 8852 (method and tooling) available from the RENAULT TRUCKS Spare Parts Department.

# 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 the 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

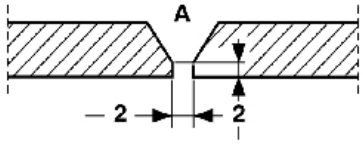
Clean the parts, primarily at the location of the weld and at the connection of the earthing wire. This allows:

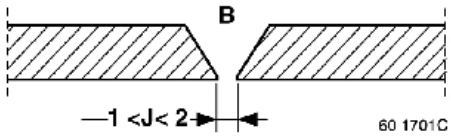
- free and regular electrical current flow (regularity of weld bead),
- avoidance of inclusion of impurities in the molten metal (weld quality),
- avoidance of spatter and emission of smoke (safety for the welder).

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

**Preparation of specific edges on chassis frames**

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




**Method of welding to be specifically used on chassis frames**

– Preparation of the edges at 45°

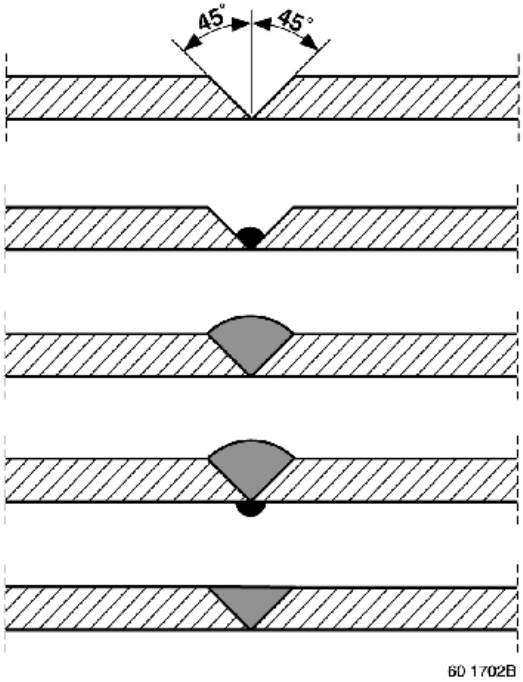
– Tack

– Position slave butts

– Weld on one single side

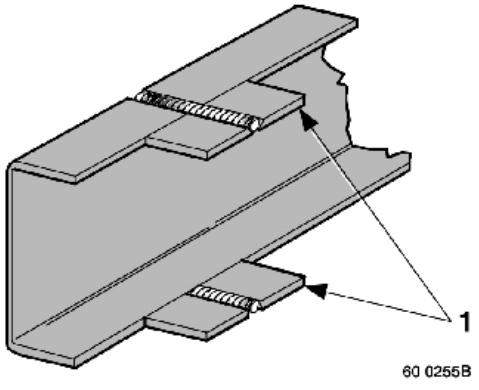
– Weld on second side

– Welds ground 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 process

**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

Coated welding rods recommended: standard NF EN 499 (January 1995)

EN 499 E 38 2 1 NI B for class : A - B - C
EN 499 E 46 2 1 NI B for class : D - E
EN 499 E 50 2 1 NI B for class : F
E 515/5 B 26 BH for steels class F

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

### MIG or MAG semi-automatic welding set

**MIG:** - Metal Inert Gas
- for welding with electrode wire under inert gas shield (Argon, Helium...)

**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 four 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** | **Class D** | **Class E** | **Class F** |
| UTS in $N/mm^2$ min. | 450 | 500 | 540 | 610 |
| YP at 0.2% in $N/mm^2$ min. | 355 | 445 | 490 | 560 |
| E % min. | 23 | 20 | 18 | 15 |
| KCV at - 20° C J/cm2 min., longitudinal | 35 | 35 | 35 | 37,5 |
| Bending, transversal | 1 e | 1 e | 1.5 e | 1.5 e |
| Grain size | n° 5 | – | – | – |
| = European equivalent French standards | S 355 MC NF EN 10149.2 | S 420 MC NF EN 10149.2 | S 500 MC NF EN 10149.2 | S 550 MC NF EN 10149.2 |
| = German standards equivalent DIN | QStE 380TM SEW 092 | QStE 420TM SEW 092 | QStE 500TM SEW 092 | QStE 550TM SEW 092 |
| = British standards equivalent BS | 43 F 35 BS 1449 | 46 F 40 BS 1449 | | |
| = American standards equivalent ASTM | Gr. 50 050 YKL ASTM 607–50 | Gr. 60 060 YKL ASTM 607–55 | Gr. 70 | Gr. 80 |
| = EURONORM standards equivalent 149-80 | FeE355 TM | FeE420 TM | FeE490 TM | FeE560 TM |

## 2.2 REINFORCEMENT, EXTENSION, REDUCTION OF SIDEMEMBERS

### 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

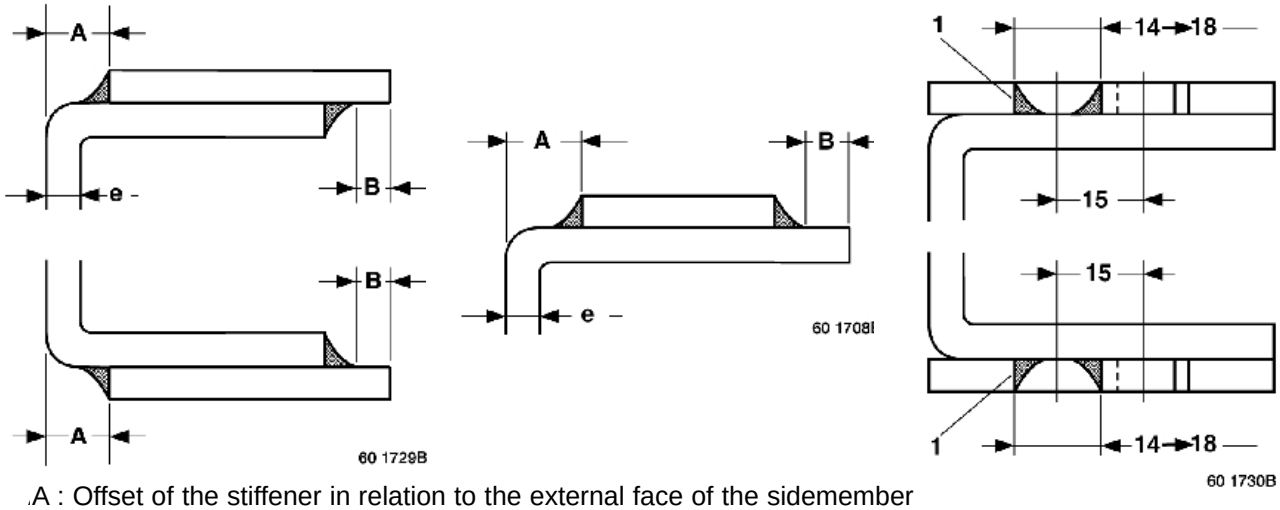
For inner reinforcements and chassis flange stiffeners, the thickness should be the same as the thickness of the sidemember.

**NOTE**

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

**Examples of reinforcements**

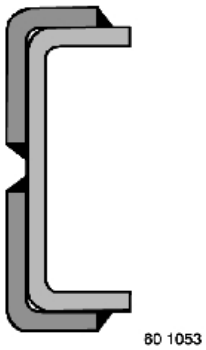
Sidemember upper and lower stiffeners




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 the sidemember | A | B |
|---|---|---|
| e < 6 mm | 10 mm | 15 mm |
| e ≥ 6 mm | 15 mm | 15 mm |

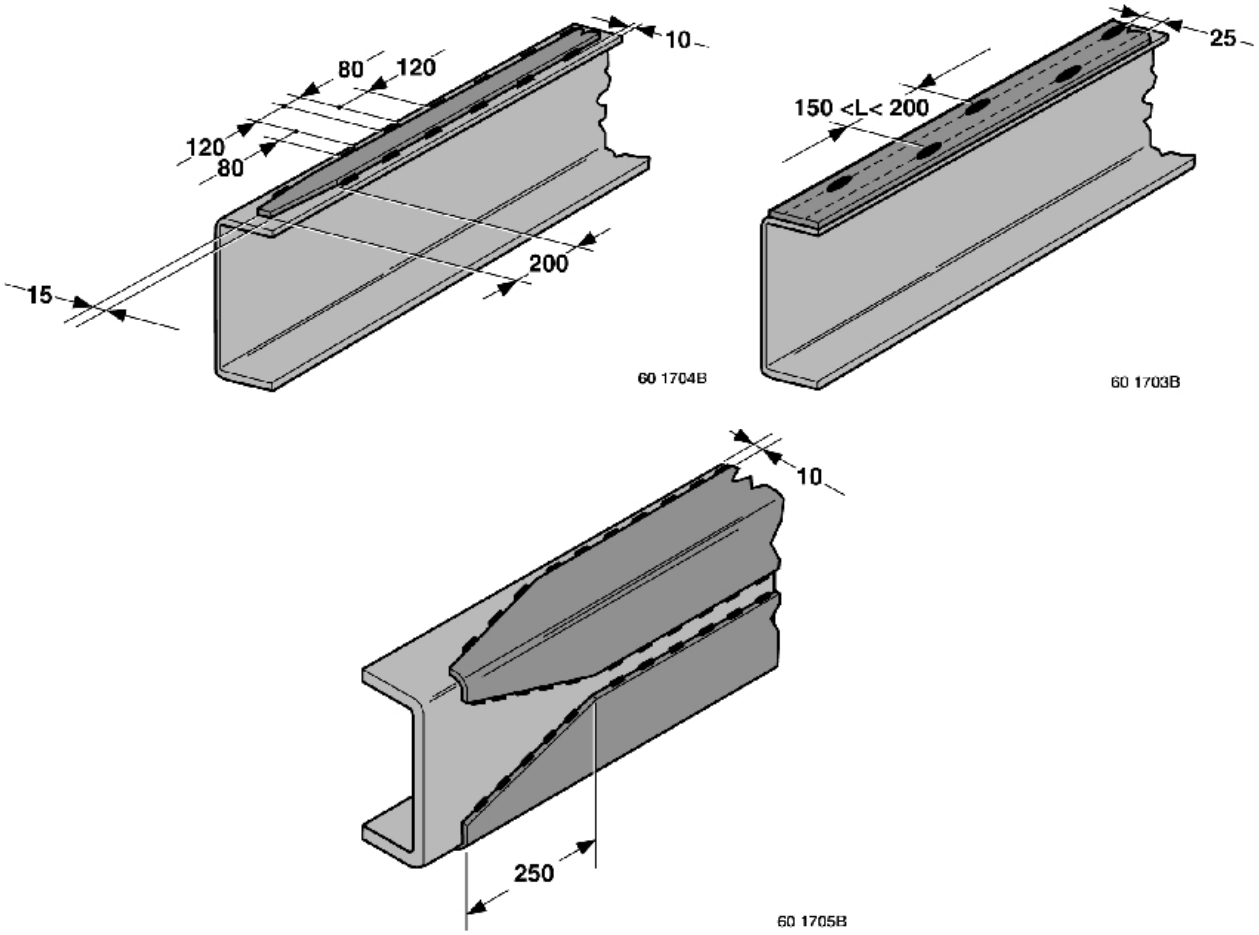
**Upper and lower stiffeners using angle-irons :**



## 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:

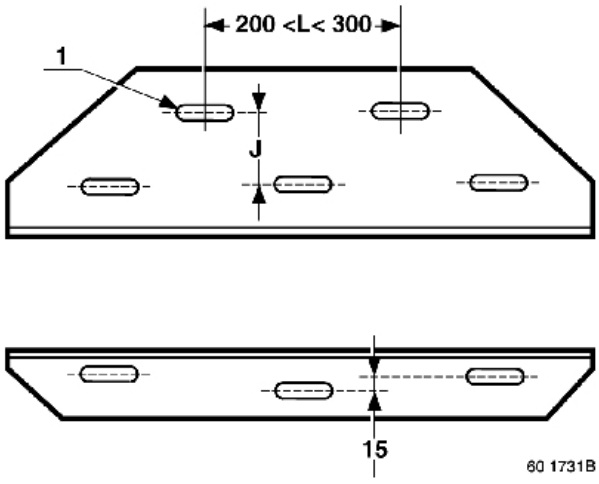
**Intermittent beads** by electric welding: as guidance, 80 mm beads spaced 120 mm apart and staggered.




**"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.



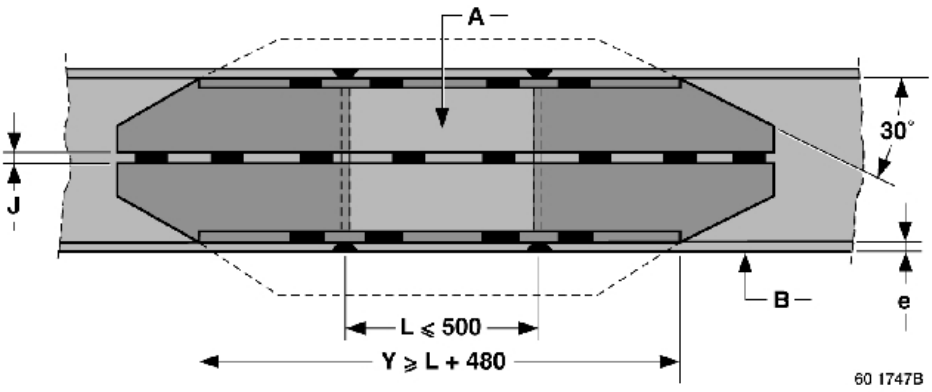
## Extension, shortening of sidemembers in the wheelbase

**Key**

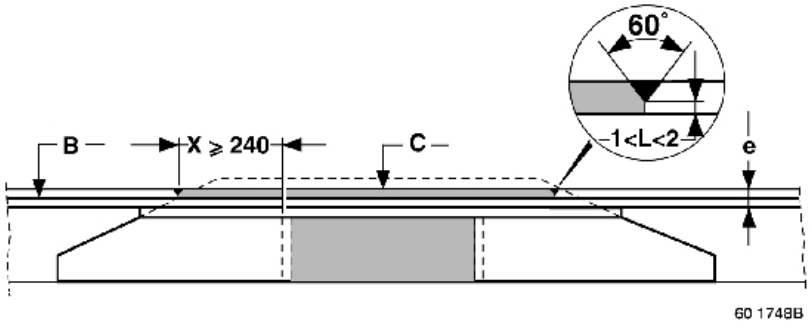
A - piece of sidemember added,
B - sidemember,
C - reconstituted stiffener,
D - welds projecting beyond flanged edge with butt-ends then longitudinal grinding (elimination of sharp edges),
e - thickness of the sidemember,
F - angle-iron of thickness (E) max.: E ≤ (e - 1 mm),
G - welds,
J - weld penetration 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 the sidemembers in the wheelbase**

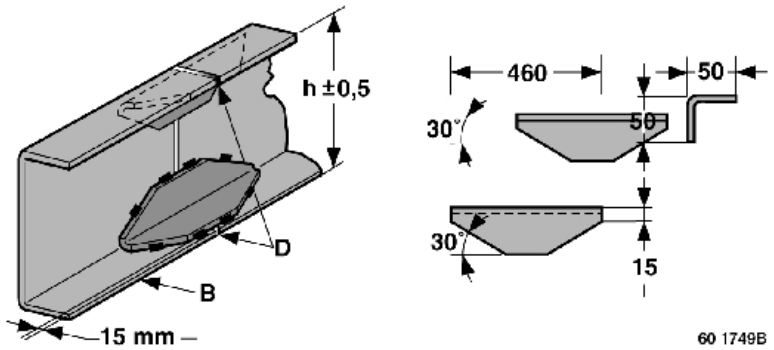
**Sidemember without stiffener flat on the flange**

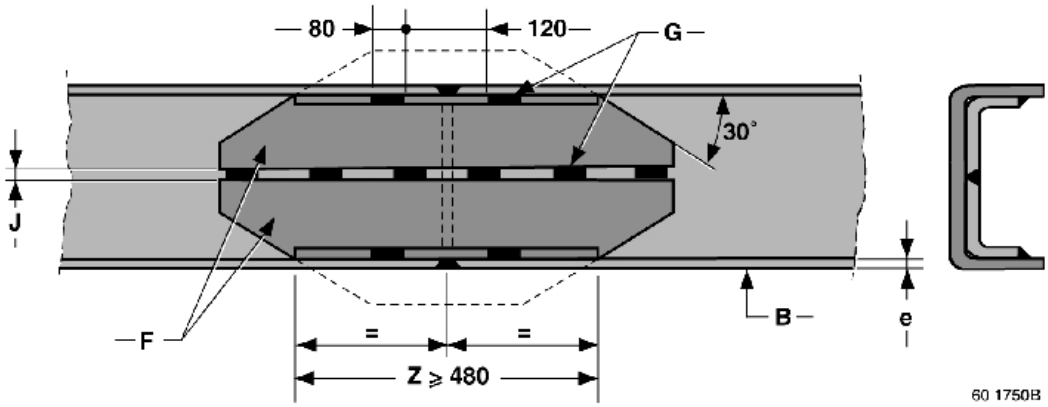



**Sidemember with stiffener flat on the flange**



**Sidemember with stiffener flat on the flange**




## 2.2.3 Modification of the rear overhang

If the bodywork or the equipment fitted do not alter the weight and dimensional characteristics of the chassis entered on the description sheet, the vehicle can be submitted to the Type Approval Department without any action being necessary on the part of RENAULT TRUCKS (within the permitted limits in force).

- Welding stiffeners are required for drawbar rigids or if the extension is longer than 400 mm for a solo vehicle. Examples: Drawbar rigid; tail lift; crane at the rear of the chassis; tipper; etc.
- Extension of the rear overhang will also be required when the rear extremities of the bodywork project beyond the maximum authorized value which is indicated on the bodybuilder's drawing and calculation sheets relating to the vehicle.

## Attachment of cross-members

Cross-members should be attached with nut and bolt hardware of the 10.9 S2S protected class as per standard 01714002 and distributed by RENAULT TRUCKS.

### Towing cross-members

Please refer to the chapter on "Drawbar cross-members" in the section entitled "RENAULT MASCOTT Special Bodybuilding Features".

### 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 crossmember 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 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 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 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 1:20 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 use, drilling or welding of spring hangers.
- Any modification of: the chassis, the driveline, or the suspension.
- Fastening of sub-frames to our sidemembers by welding.
- The drilling of stiffener gussets.
- The notching of sidemembers, gussets or cross-members.
- With the exception of special cases described in this document, the use or modification of our nut and bolt hardware and our riveting for the attachment of a body or sub-frame.
- The attachment of sub-frames by U-bolts.

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 4 body guides 2 at the front, 2 at the rear).

For bolted fastenings, comply with the following instructions:
- By preference use brackets attached to the chassis.
- Use the fixing bolt holes dia. 11, 13 or 15 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 on the “Attachment of sub-frames”.

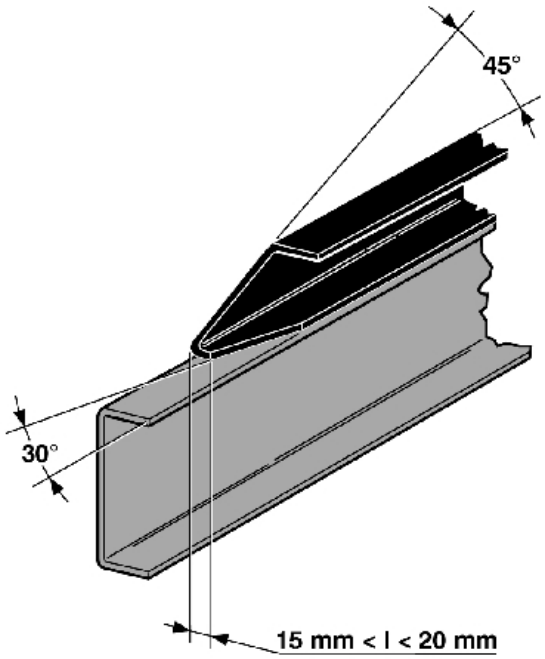
### 2.3.2 Protection against exhaust heat radiation

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 entitled “RENAULT MASCOTT 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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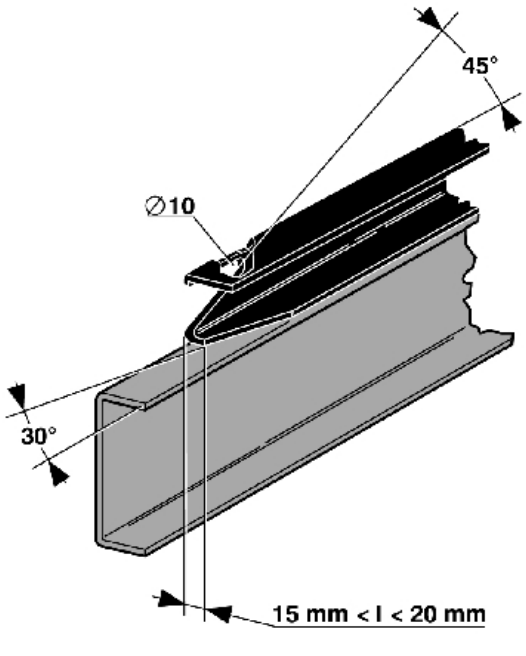


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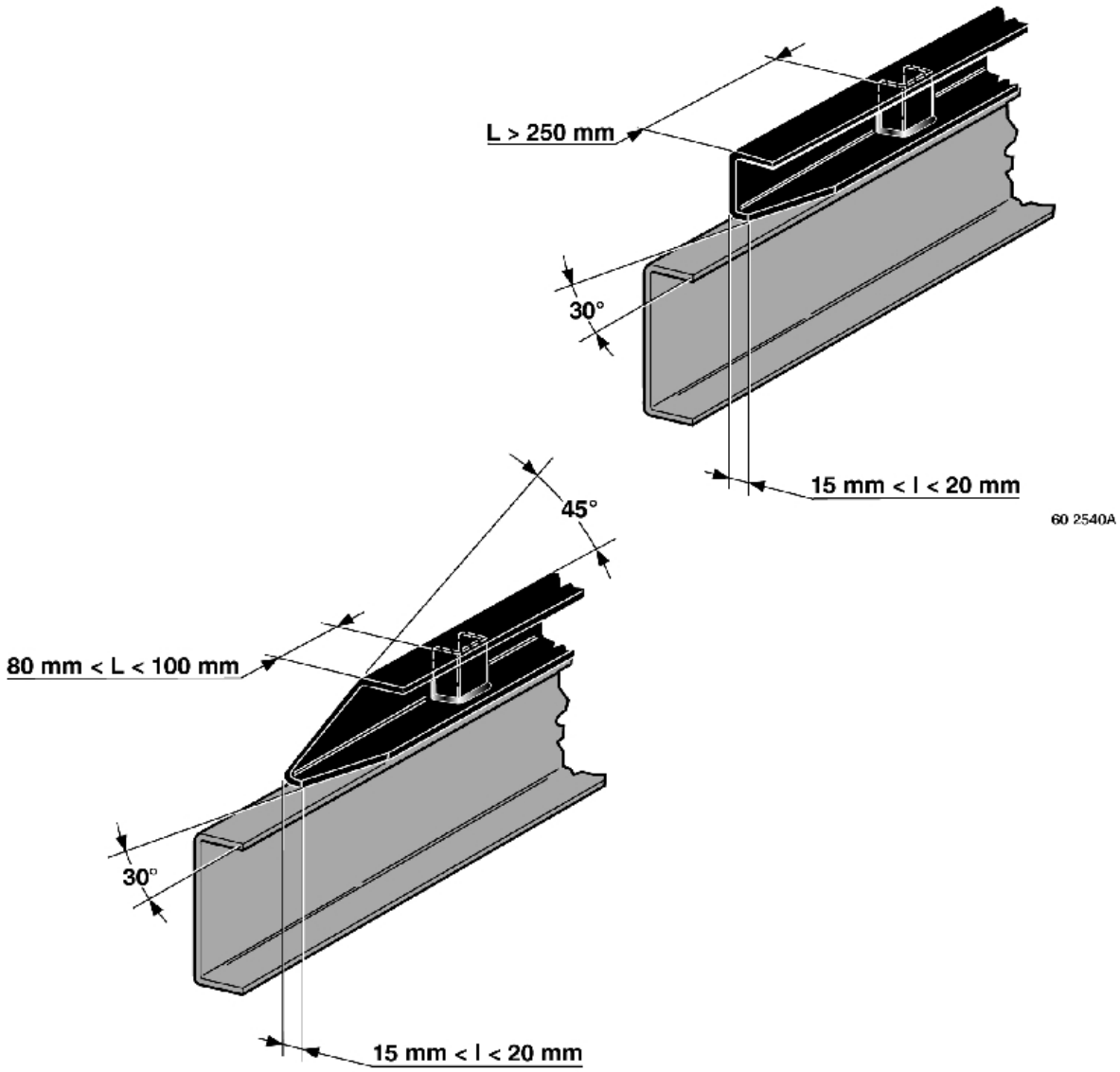
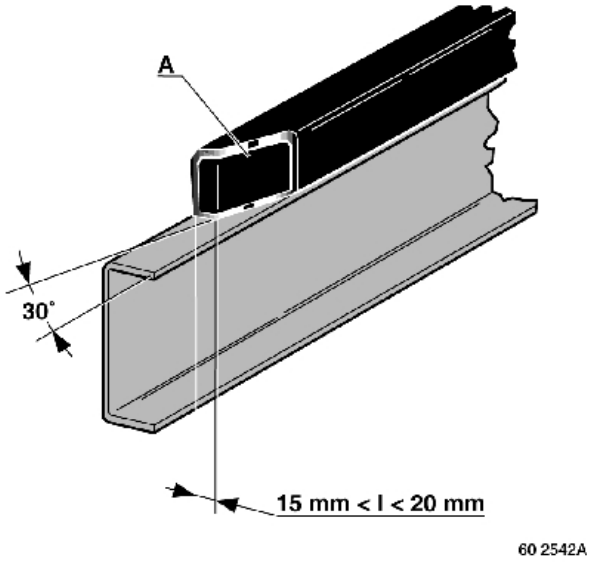



When the sub-frame is constructed of square or rectangular tube section, we also suggest the cut-out shown below.

A: Blank off with 1.5 mm thick sheet metal



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

The torques indicated in the table are the nominal torques (i.e. average value calculated on the basis of the minimum and maximum torque).

Class III is the class covering precision tightening (± 20 % of nominal torque) in accordance with Standard 01504002 (coefficient of friction 0.15 ± 0.03).

The tightening torques are given for nut and bolt hardware that is dry and coated with Dacromet.

| Description | Characteristics | Class of Steel | Part N° | Tightening torque |
|---|---|---|---|---|
| Screw | H 10 x 125 L 30 | 10.9 | 50 03 101 460 | 60 N.m |
| | H 10 x 125 L 50 | 10.9 | 50 03 101 148 | 60 N.m |
| | H 12 x 125 L 40 | 10.9 | 50 03 101 151 | 110 N.m |
| | H 12 x 125 L 45 | 10.9 | 50 03 101 749 | 110 N.m |
| | H 12 x 125 L 50 | 10.9 | 77 03 101 679 | 110 N.m |
| | H 12 x 125 L 60 | 10.9 | 50 03 101 153 | 110 N.m |
| | H 14 x 150 x 40 | 10.9 | 50 03 101 161 | 170 N.m |
| | H 14 x 150 x 50 | 10.9 | 50 03 101 162 | 170 N.m |
| | H 14 x 150 x 60 | 10.9 | 50 03 101 163 | 170 N.m |
| | H 14 x 150 x 90 | 10.9 | 50 03 101 169 | 170 N.m |
| | H 14 x 150 x 100 | 10.9 | 50 03 101 660 | 170 N.m |
| | H 14 x 150 x 110 | 10.9 | 50 03 101 171 | 170 N.m |
| | H14 x 150 x 120 | 10.9 | 50 03 101 172 | 170 N.m |
| | H14 x 150 x 130 | 10.9 | 50 03 101 887 | 170 N.m |
| | H14 x 150 x 140 | 10.9 | 50 03 101 173 | 170 N.m |
| | H 16 x 150 x 50 | 10.9 | 50 03 101 103 | 220 N.m |
| Collar screw | H 10 x 125 L 30 | 10.9 | 50 03 002 048 | 60 N.m |
| | H 12 x 125 L 40 | 10.9 | 50 03 002 049 | 110 N.m |

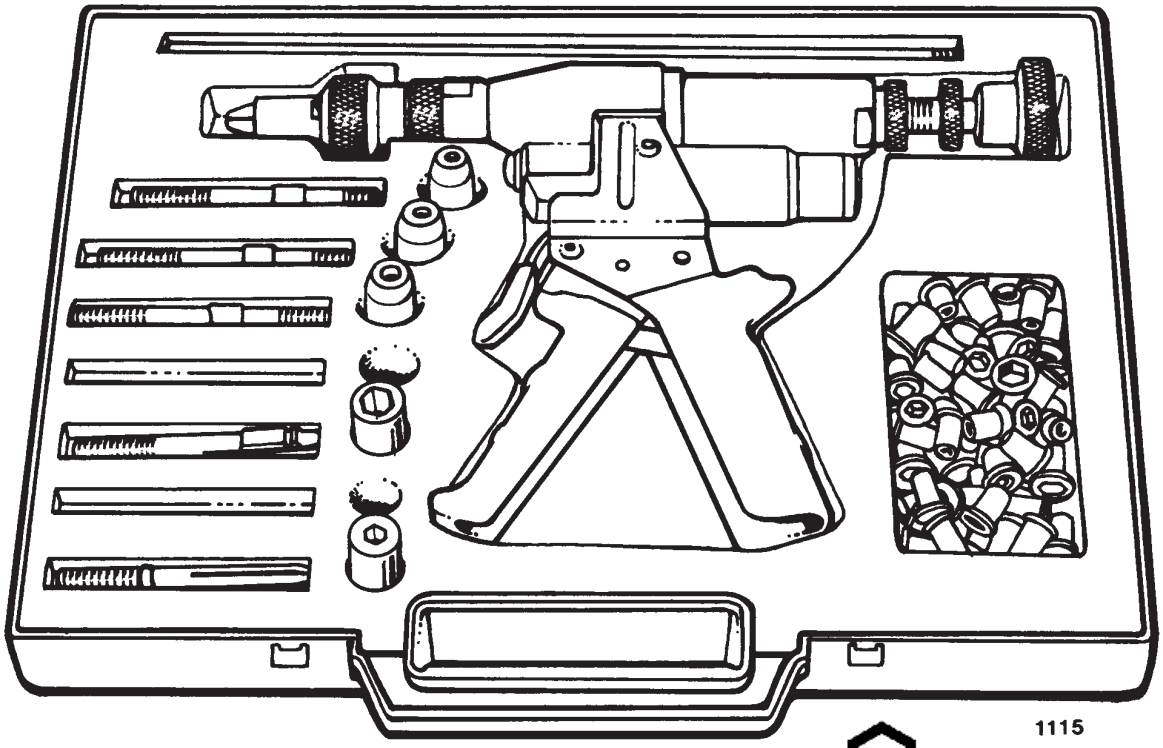
| Description | Characteristics | Part N° |
|---|---|---|
| Cone washer | 10 x 20 x 2.2 | 50 03 058 081 |
| | 10 x 24 x 2.8 | 50 03 058 071 |
| | 10 x 27 x 2.8 | 50 03 058 076 |
| | 12 x 30 x 3.2 | 50 03 058 075 |
| | 14 x 28 x 3 | 50 03 058 069 |
| | 16 x 32 x 3.4 | 50 03 058 034 |
| | 16 x 39 x 3.6 | 50 03 058 070 |
| Flat washer | 10 x 22 x 3 | 50 03 053 453 |
| | 10 x 27 x 3 | 50 03 053 455 |
| | 10 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 |
| Cone washer “Belleville” type | 14.5 x 35 x 1.8 | 50 10 377 934 |

| Description | Characteristics | Class of Steel | 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 |
| Locknut DRH (flanged) | 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

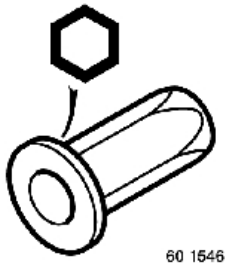
The attachment of equipment to the bodywork must be done with fluidtight crimping nuts.

### Tools and crimping nuts




**M6 crimp nut - hexagonal barrel**

Part N°: 50 03 043 050




**Method:**

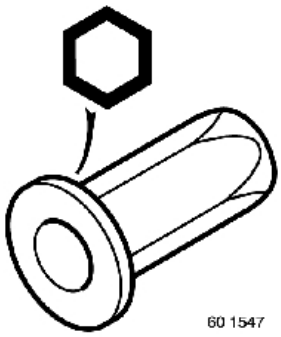
- Drill a dia. 9.2 mm hole (refer to chapter entitled “Drilling of bodywork members for the fitting of accessories”).
- Use the OPEX tooling from OTALU S.A. (RENAULT TRUCKS approval N° 8162).
- Punch out the hexagonal.
- Insert the nut for crimping.

**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 an 11.2 mm diameter 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 approval for its equipment to cover the requirements of its range. Their attachment being by means of bolts, this allows them to be moved down along the sidemembers to suit such modifications that the chassis may undergo. This must be observed, along with the maintenance of the attachment method detailed on the 1:20 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 which 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 requires 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. 80o C).
The prolonged use of the engine under these conditions can cause malfunctions which could adversely affect the 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 the 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 of 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 1:20 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.
Consult the Product Applications Department to obtain the relevant information and technical approval for the assembly.

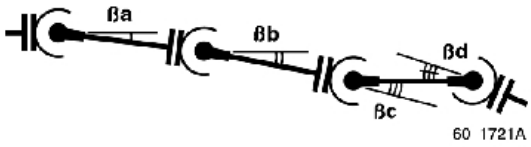
## 3.4 Front and rear power take-offs

### 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 $\beta_E$ permissible for all articulations).
This angle $\beta_E$ must comply with the following condition:

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



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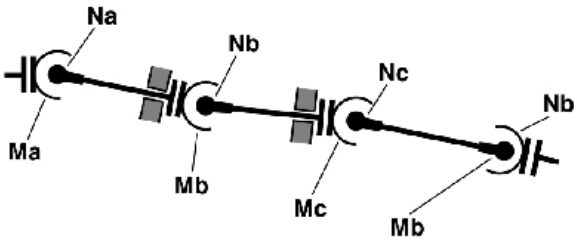
Rule for sign β:
Yoke N° 1 is to be considered as the reference yoke.

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

Example 1:

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



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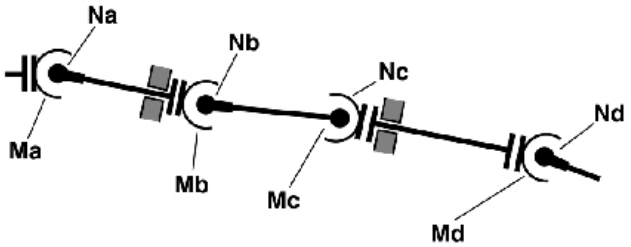
M - Leading yokes
N - Trailing yokes

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

Example 2:

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



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**Angular acceleration criteria $\theta_1$**

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

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

$$\theta_1 \leq 270$$

$\theta_1$ : criterion of acceleration in rd/s$^2$
N : max. speed of rotation in rpm

**NOTE**

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

**Measured criteria $\theta_2$:**

The angular acceleration or torsional vibrations criteria value $\theta_2$ must not exceed 1500 rd/s$^2$ at the PTO output or at any point whatsoever of the driveline for a downstream inertia of I such that I ≤ 0.2 kg/m$^2$.

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

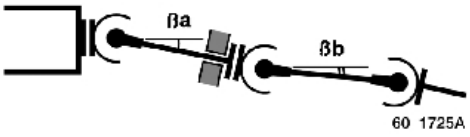
**NOTE**

This limit value $\theta_2$ takes into account possible dynamic amplification of the driveline.

**Transversal stress criteria for prop shaft tubes and bearings.**

Example $\beta_1$ and $\beta_2$ maximum not to be exceeded.

- **$\beta_a$ < 2°** for a prop shaft with bearing.
- **$\beta_b$ < 7°** for a prop shaft with sliding yoke.



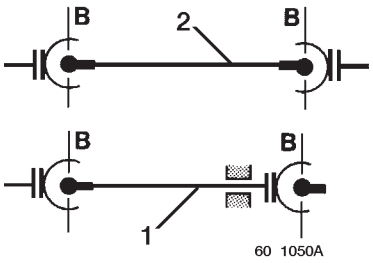

**NOTE**

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):

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

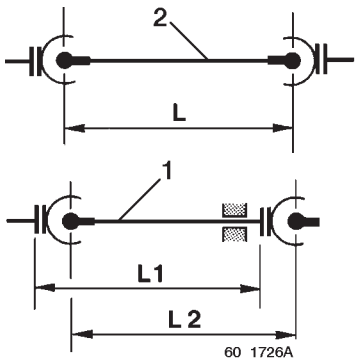



1 - 1/2 prop shaft
2 - prop shaft

**NOTE**
$g = m = 10\ m/s^2$

### 3.4.3 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

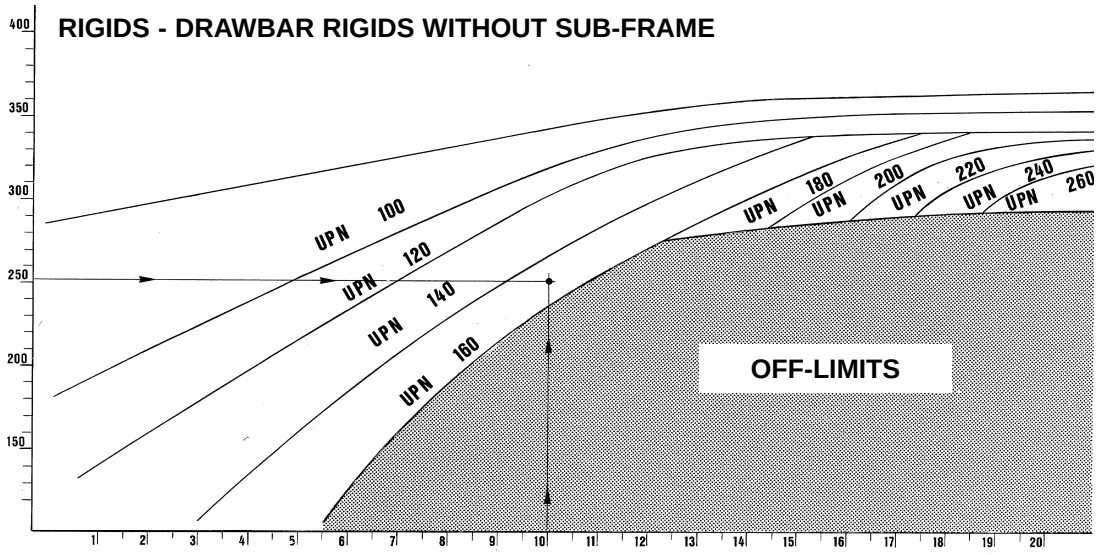
**Example:**

A chassis with sidemembers 252 mm long, fitted with a crane having a lifting capacity of 10 tonnes per metre.

The chassis requires a sub-frame built of size 160 U-section beams (—- direction of reading).

The U-section can be replaced by any other steel section offering equivalent total inertia.

Height of sidemember




Crane LIFTING TORQUE in tonnes/metre

The U-section beams (UPN) can be replaced by any other steel section offering equivalent total inertia (I/V).

| | | |
|---|---|---|
| UPN 100 : I/V = 41200 $mm^3$ | UPN 160 : I/V = 116000 $mm^3$ | UPN 220 : I/V = 245000 $mm^3$ |
| UPN 120 : I/V = 60700 $mm^3$ | UPN 180 : I/V = 150000 $mm^3$ | UPN 240 : I/V = 300000 $mm^3$ |
| UPN 140 : I/V = 86400 $mm^3$ | UPN 200 : I/V = 191000 $mm^3$ | UPN 260 : I/V = 371000 $mm^3$ |

**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 body-work 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.

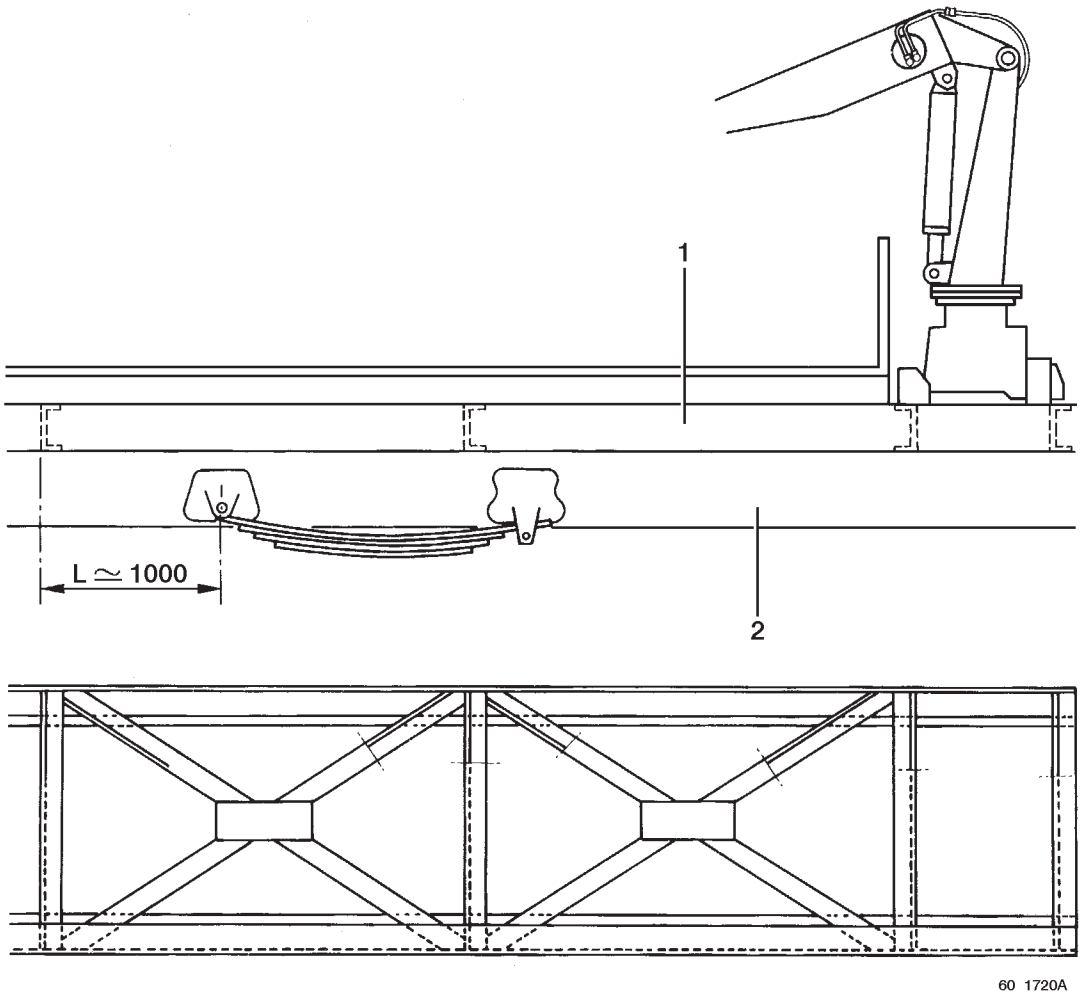
### 3.6.3 Crane in the rear overhang

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.

The sub-frame required for such assemblies must be diagonally braced in accordance with the diagram below, using **U-section beams** with a module that is immediately lower than that recommended for the sub-frames.

**Example:** A sub-frame made of size 140 U-section beams shall be diagonally braced with size 120 U-section beams.

For a crane mounted in the rear overhang, in addition to the recommendations contained in the “WARNING” paragraph above, the following must also be observed:
- The minimum front axle load, for a vehicle fitted with a body and equipped with crane.




1 - Sub-frame
2 - Vehicle chassis

## 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 2,000 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. Nut and bolt hardware is to be of class 10.9 fine pitch with a diameter of 12 mm. The plates are to be fastened in position with at least 6 nuts and bolts on each side of the chassis and by 3 bolts and nuts or only by welding to the sub-frame.

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 bolted plate to the chassis.

**WARNING**

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

- The maximum plated gross vehicle weight (GVW).
- The maximum load on the 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).
- The maximum plated loads on the front and rear axles.
- The maximum rear overhang indicated in the Type Approval Department’s descriptive sheet and the bodywork diagram.

If any loads are exceeded, you should 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 Special recommendations for tail lifts from 1500 to 2000 kg without landing legs

**1,500 kg tail lift**

- This is only possible using our chassis with a GVW equal to or greater than 12 tonnes.

**2,000 kg tail lift**

- This is only possible using our chassis with a GVW equal to or greater than 19 tonnes.
- For off-limits and for vehicles with a lower capability, consult the RENAULT TRUCKS Product Applications Department.

Should the run-under guard have to be modified, care should be taken to ensure compliance with regulations in force.

## 3.7.5 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 corresponding 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.

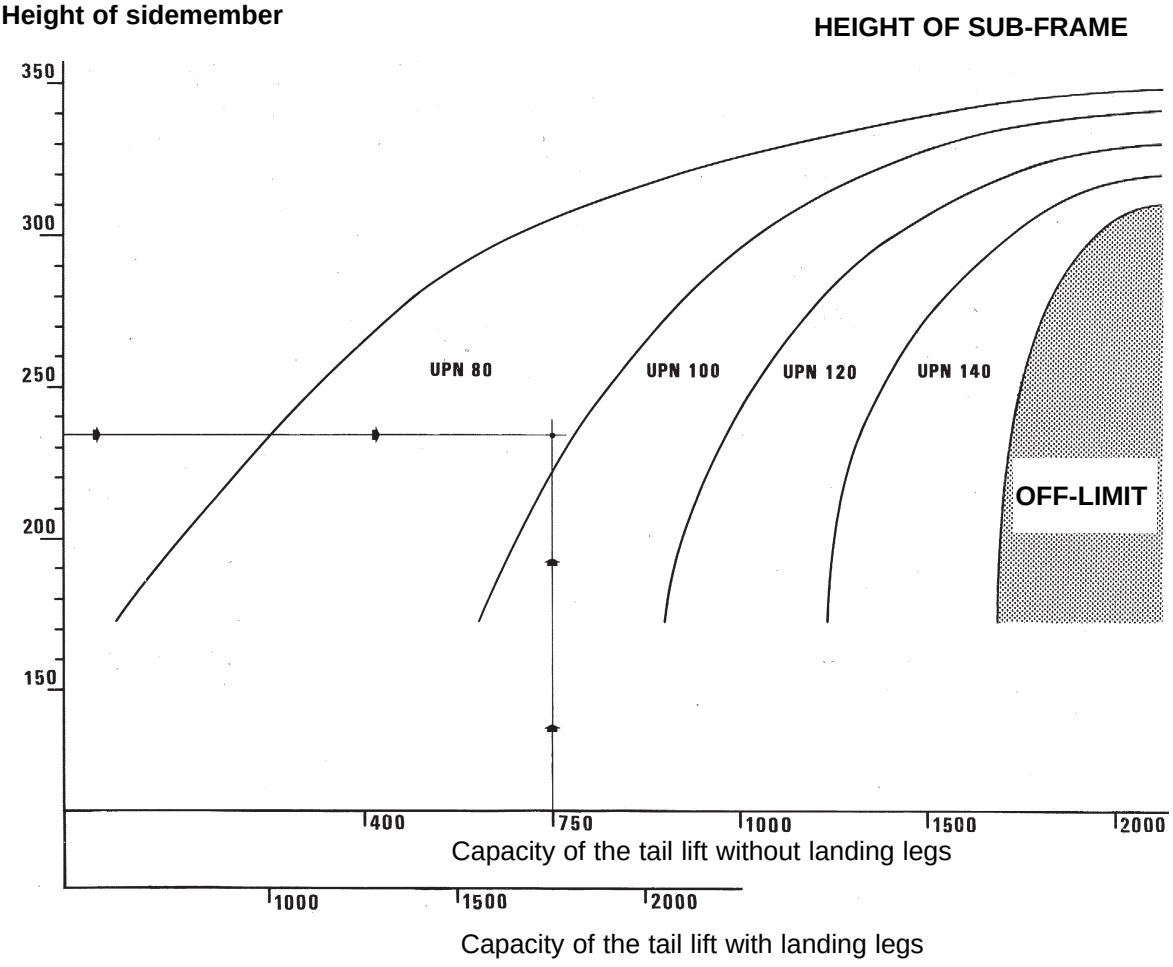
**NOTE**

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 234 mm high sidemembers, equipped with a 750 kg tail lift.

It requires a sub-frame made of size 80 U-section beams.




**NOTE**

The size 80 U-section beams can be replaced by any other section which gives an equivalent inertia (I/V).

UPN 80 : I/V = 26500 $mm^3$

UPN 100 : I/V = 41200 $mm^3$

UPN 120 : I/V = 60700 $mm^3$

UPN 140 : I/V = 86400 $mm^3$

## 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 the General Section).

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, you should contact the RENAULT TRUCKS 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.

## 3.11 Fifth wheels (baseplates and couplings)

Tractor chassis are normally supplied as original equipment with bolted angle irons. In this case they allow for the longitudinal positioning of the baseplate for the fifth wheel on the chassis, in order to ensure good load distribution on the tractor axles.

The fifth wheel is located on these angle-irons by the use of a cross-member and/or a baseplate (in certain cases the baseplate is sufficient).

The fitting of the fifth wheel must allow for the manoeuvring of a swan-necked semi-trailer in accordance with the standard ISO 015/1726: Road vehicles - mechanical links between tractors and semi-trailers - interchangeability.

The bedplate and the baseplate must be independently mounted, with a minimum strength equal to that of the attachment for the fifth wheel.

Baseplates for each type of vehicle are available in several heights from the Spare Parts Department.

Refer to the Product Applications Department.

### 3.11.1 Mounting standards

Comply with the standard in force.

**Kingpin 50 mm (2”) dia.**

The attachment of the fifth wheel to the chassis must be done using 12 bolts size M16, quality class 10.9.

**Kingpin 90 mm (3.5”) dia.**

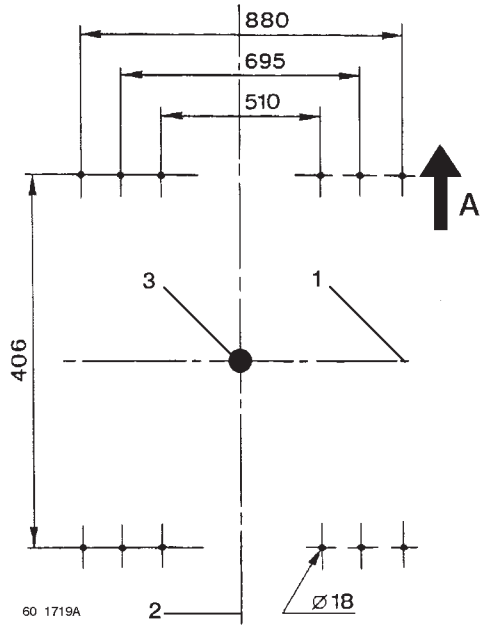
For details of the attachment of the fifth wheel, refer to the Product Applications Department or comply with the recommendations of the supplier.

These values apply equally for the attachment of the baseplate.

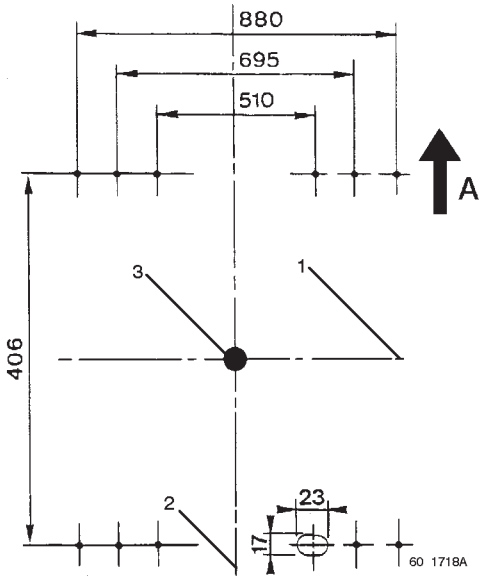
As far as swan-necked semi-trailers are concerned, which are not constructed in accordance with the ISO Standard in force, the attachment of the fifth wheel must take into account the instructions given above, whilst conforming with the capability of the tractor to manoeuvre, i.e. it must not come into contact with parts of the chassis, such as mudguards, rear lamps, registration plates, the back end of the chassis, the tyres, etc.

If the changing of position of the fifth wheel towards the front causes any interference of the mounts of the baseplate with those of a cross-member, you are obliged to refer to the Product Applications Department.

**Drawing for drilling the baseplate for the attachment of the fifth wheel using 12 nuts and bolts dia. 16 mm (DIN Standard 74081)**




**Drawing for drilling the baseplate for the attachment of the fifth wheel by 12 nuts and bolts dia. 16 mm with slotted holes (Standard NF R 41-171 dated October 1986)**




A - Direction of movement of vehicle
1 - Lateral axis
2 - Longitudinal axis of the tractor engine
3 - Kingpin axis

# CHAPTER -B-
# “RENAULT MASCOTT”
# SPECIAL BODYBUILDING FEATURES

# 1. PRESENTING THE “RENAULT MASCOTT” SERIES

This RENAULT MASCOTT series covers GVW*s from 3.5 to 6.5 to 18 tonnes.

The bodybuilding funciton 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 sidemebers.

The series offers a wide choice of possible configuraitons, thus meeting the most diverse needs.

The main variants are as follows (according to equiupment):

**Power units**

- 2800 cc naturally aspirated with 85 hp rating,
- 2800 cc turbo with 106 hp rating,
- 2800 cc turbo and “Common rail” electronic diesel injection with 106 and 125 hp rating,
- 2800 cc variable geometry turbo with 140 hp rating.

**Chassis cab**

- 3-place short cab,
- up to 7-place double cab,
- chassis cowl,
- 4 wheelbases : 3130, 3630, 4130, 4630 mm,
- 5 tonnages: 3500, 5000, 5500, 6000, 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 posiiton rear bulkhead, panel body.

Its other attributes are:

**Performance**

- braking featuring 4 disc brakes,
- 6-speed gearbox as standard on 125 and 140 hp versions and available as option on the 106 hp version.

**Safety**

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

**Driving comfort (depending on vehicle equipment)**

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

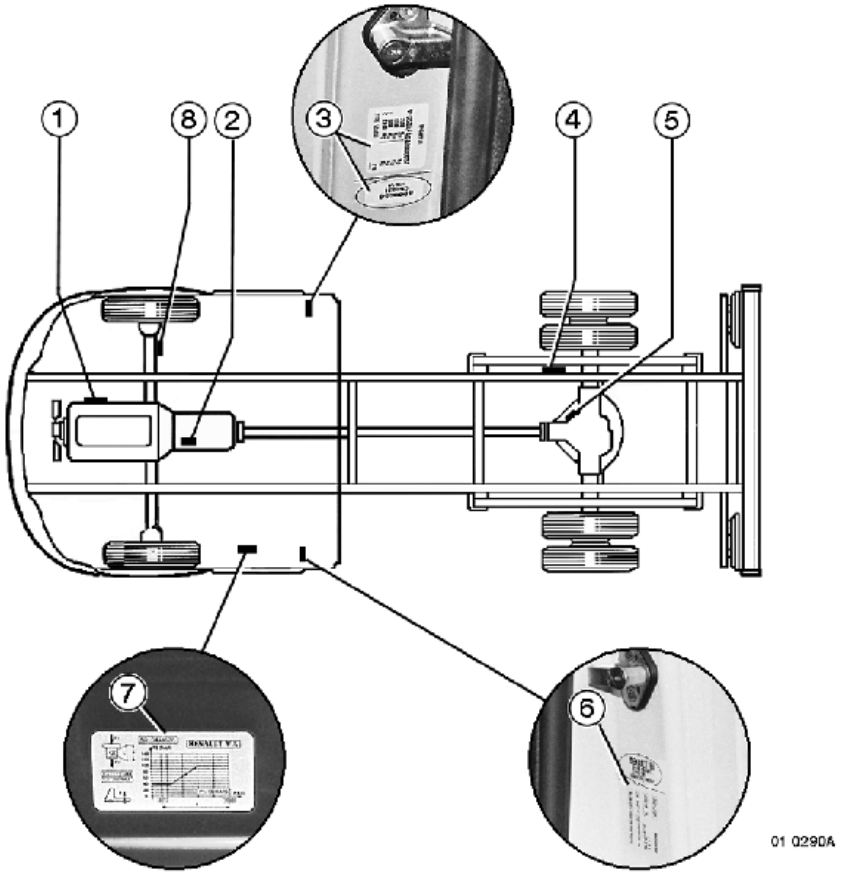
**Modularity**

- electrical pre-arrangement for bodybuilder,
- gearbox-mounted power take-off and fast idling control,
- pre-arrangement for engine pulley-mouhnted 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 = Gross Vehicle Weight

## 2. GENERAL REMARKS ON THE “RENAULT MASCOTT” SERIES

### 2.1 Identification of the vehicle




**View from above**

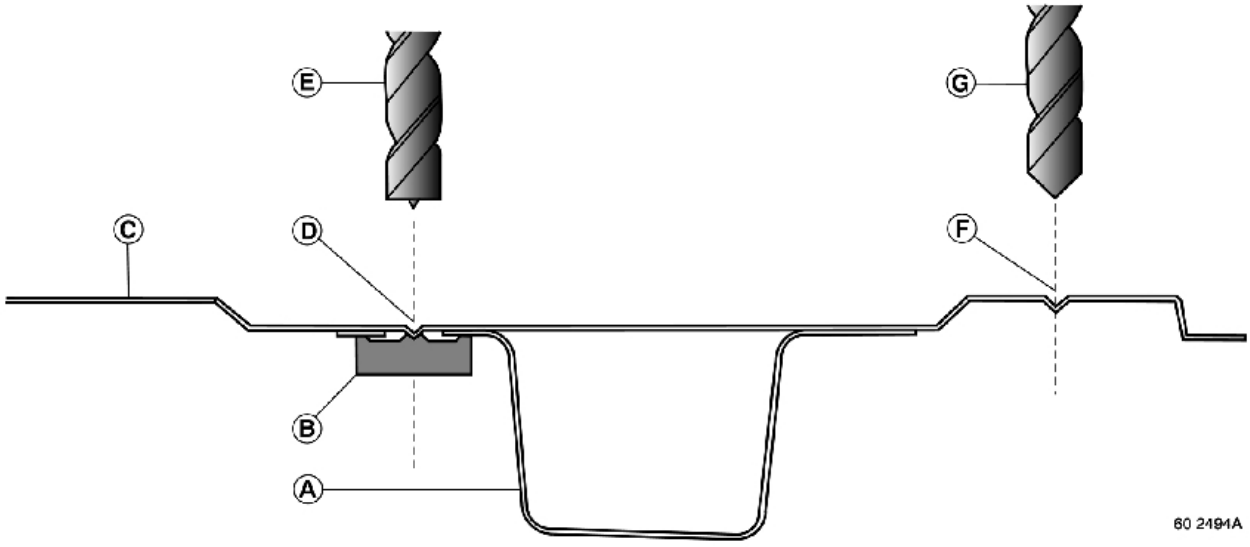
1 - engine
2 - gearbox
3 - manufacturer’s plate
CAM reference
paint reference
4 - chassis
5 - rear drive axle
6 - tachograph plate (if fitted)
7 - front axle
8 - load sensing valve plate

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

## 2.2 General drilling principles

## 2.2.1 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.




**Depending on the vehicle equipment**

A - Roof stiffener
B - Weld nut on stiffener
C - Bodywork panel
D - Positions of impressions for drilling and access to weld nut
E - Centring drill:
- dia. 11 mm for crimping nut dia. 8 mm
F - Positions of impressions for drilling and access to crimping nut
G - Centring drill:
- dia. 9 mm for crimping nut dia. 6 mm

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

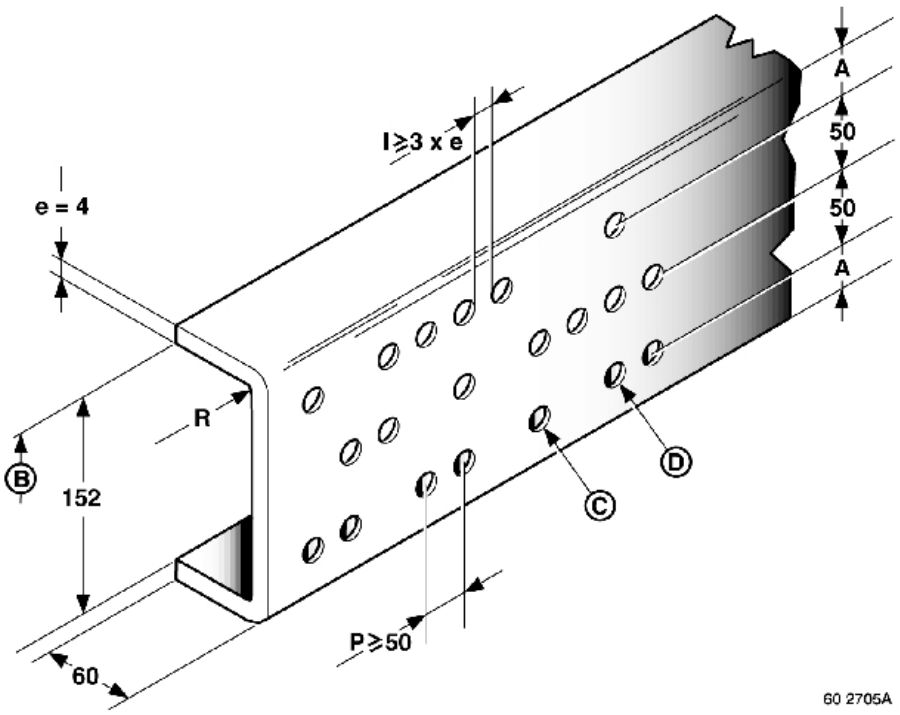
**Anti-corrosion protection:**

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

## 2.2.2 Drilling in sidemembers

### BAN

**- 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
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
F - diameter of washer or diameter of rivet head divided by two

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

C - Recommended drilling diameter: 11 mm
D - Alignment of 3 holes maximum on the same vertical axis
l - 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, ref. N° 77.01.406.425.
This product is available from the RENAULT TRUCKS Spare Parts Department.

## 2.3 Soundproofing screens and heat shields

### 2.3.1 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 sand disker, 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.

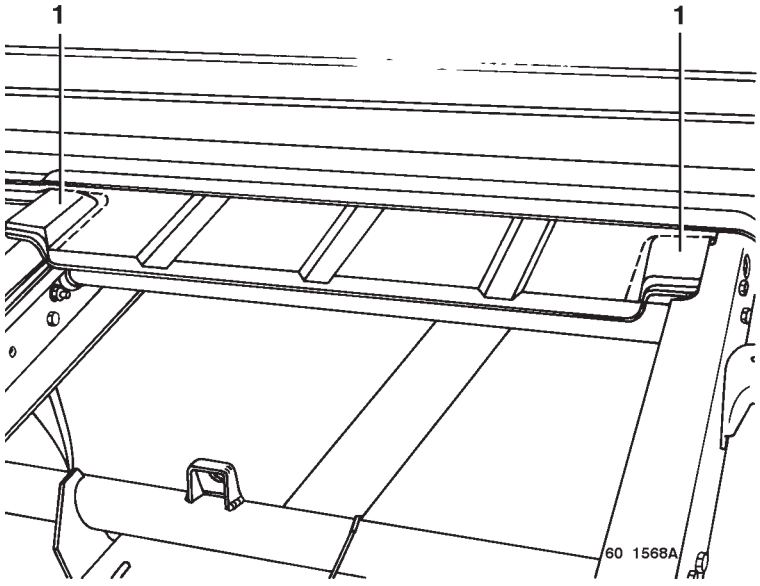
Overtightening of screen attaching nuts and bolts may lead to damage.

Observe the recommended tightening torques without fail.

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

### 2.3.2 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.




### 2.3.3 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 Use of 1/20th scale drawings and calculation sheets

Technical data sheets are tools used by sales engineers to present the range or series. They cannot be representative of particular vehicles.
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.
Only these documents will give you accurate and reliable information on vehicles according to tonnage, air intake, cab type, weights...

## 3.2 Example of a search (according to Euro 2 scenario)

1 - Click on the chosen language.
2 - Click on **“1/20th scale bodybuilder’s drawings”.**
3 - Click on **“Chassis cab drawings”.**
4 - Choose the vehicle use (click on **“Chassis cab”**).

| 4x2 Rigids | | |
|---|---|---|
| **Chassis Cab** | Chassis double cab | Van |

5 - Choose the drawing N° according to the wheelbase (click on “**5010435508**”).

| | Chassis Cab |
|---|---|
| Wheelbase | 90 to 130 hp models |
| 3130 | **5010435508** |
| 3630 short overhang | 5010435509 |
| 3630 GVW 3.5 t | 5010435510 |
| 3630 GVW 6 t | 5010435512 |
| 4130 | 5010435517 |
| 4630 | 5010435521 |

6 - Click on **“Visualize PDF format”.**

Drawing N° 5010435508

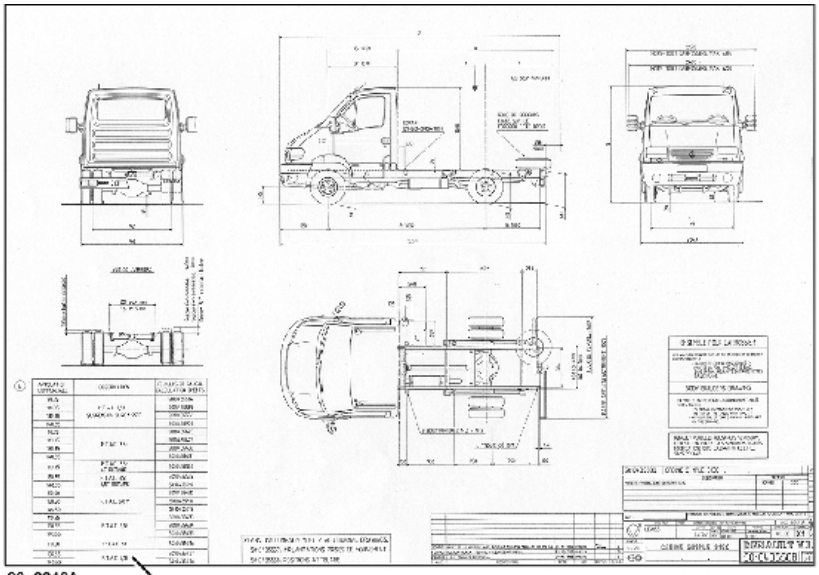
**Visualization of PDF format**

Recording of DXF format

Access to grids

7 - Visualize the drawing and print out.
On the calculation sheet table (A), choose the grid N° to consult according to engine power rating, suspension and GVW* (e.g. 5010435429).

* GVW = Gross Vehicle Weight




8 - Note down the grid N° to consult, go back to the last screen.

9 - Click on **“1/20th scale drawing grids”**.

10 - Write down the grid N° **“5010435429”**, click on **“OK”**.

| |
|---|
| Grid N° **5010435429** |
| **Find** |

11 - Click on **“Visualization of PDF format”.**

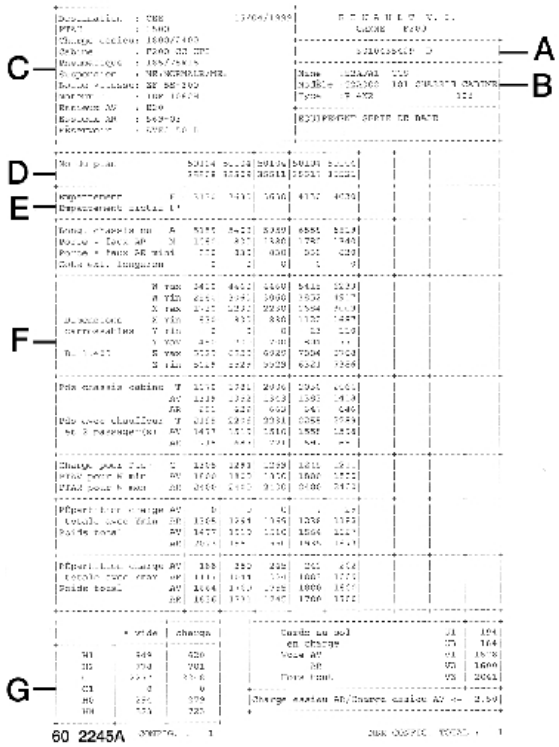
Grid N° 5010435429

**Visualization of PDF format**

12 - Visualize the calculation grid and print out.

A - calculation grid number
B - vehicle identification
C - vehicle make-up
D - 1/20th scale drawings number
E - wheelbase
F - body start dimension
G - height

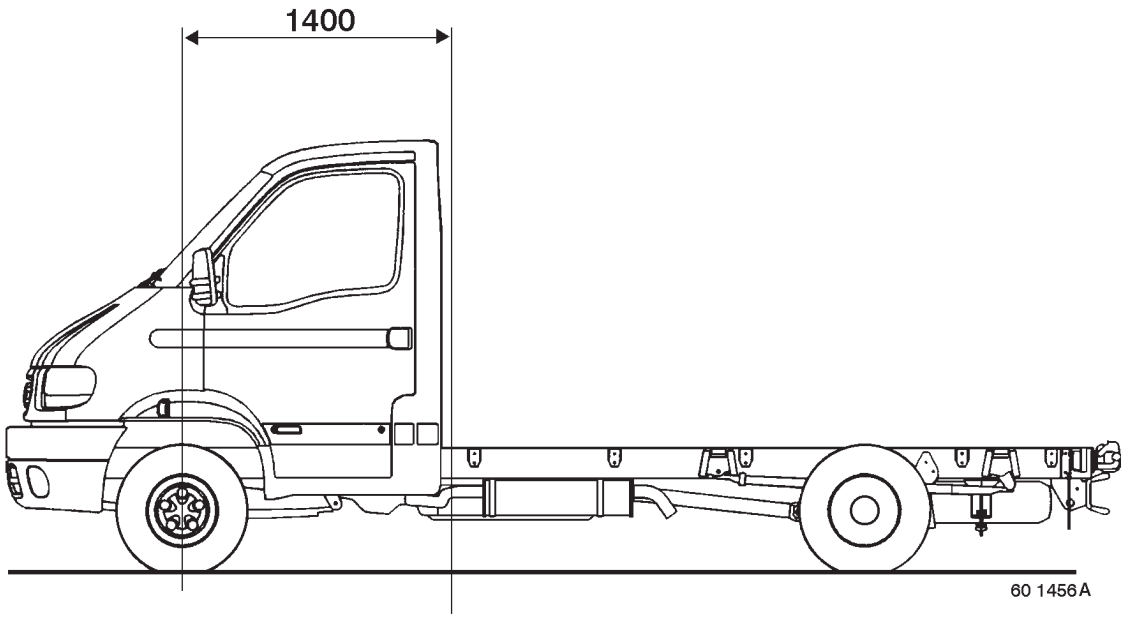
See without fail;
- cab accompanying drawings (overall dimensions, tilting radius...)
- chassis accompanying drawings (position of appliances...).



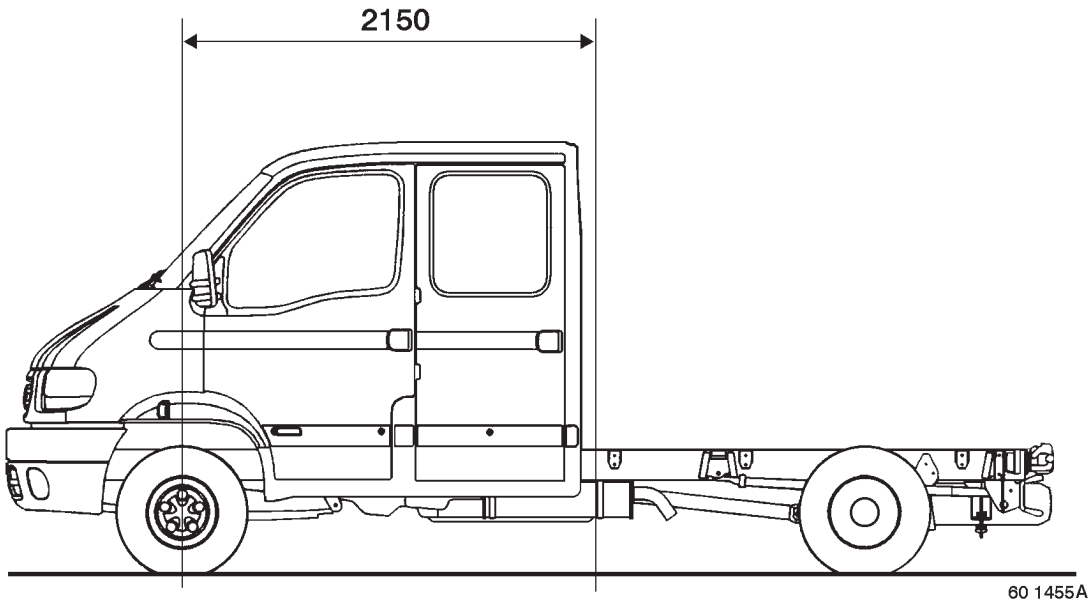
## 3.3 Body start dimension

Brackets position (see chapter 3.10).

### 3.3.1 Short cab



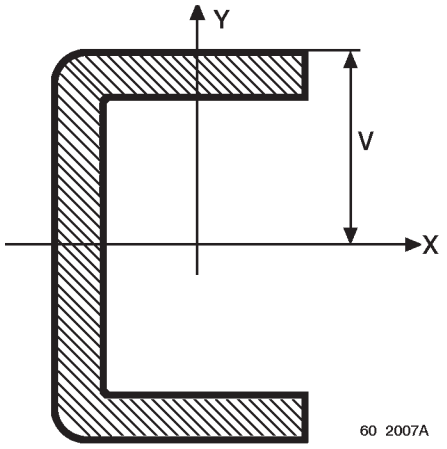

### 3.3.2 Double cab



## 3.4 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 = Gross Vehicle Weight




**Reminder of formula for calculating maximum normal surface stress**

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

$\sigma$ : 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.

## 3.5 Finishing of sub-frame start dimensions

Depending on:
- cab length (short cab, long cab, 6/7 place crew cab),
- position of engine air intake (roof level air intake or under-floor air intake),
- width of section making up the sub-frame,

the finishing of the sub-frame must be:
- symmetrical or asymmetrical (LH side start dimension different from that of the RH side),
- provided or not with horizontal cut-outs (reduction in width), allowing passage of the roof level air intake.

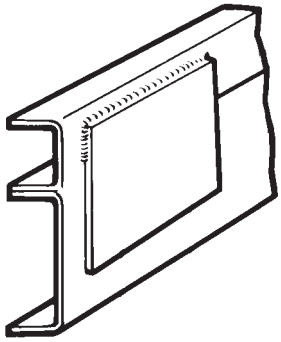
## 3.6 Lateral guiding

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

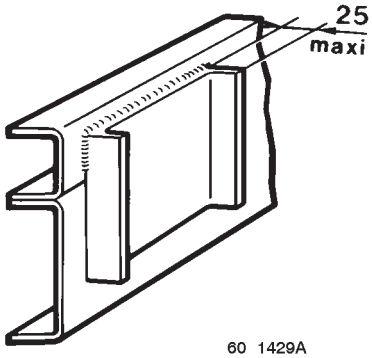
**At the front:**

Lateral guiding must be assured by two 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.



60 1761

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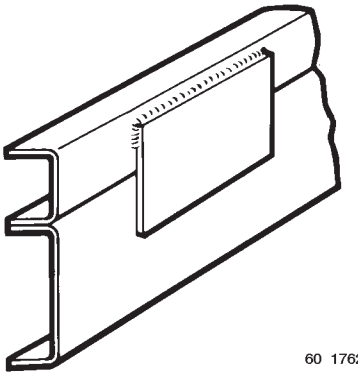
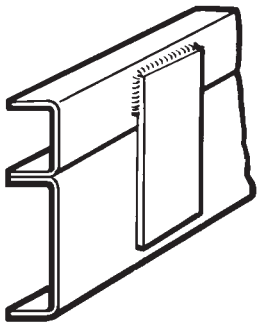


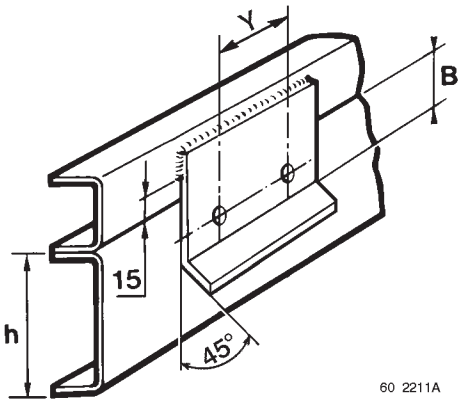
60 1762



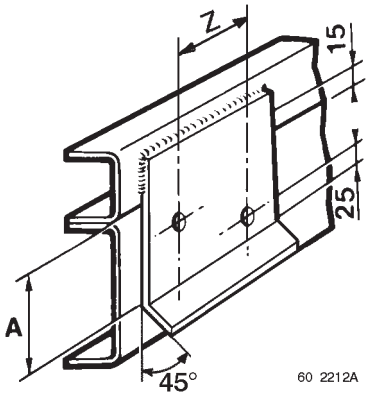
60 1763

**At the rear:**

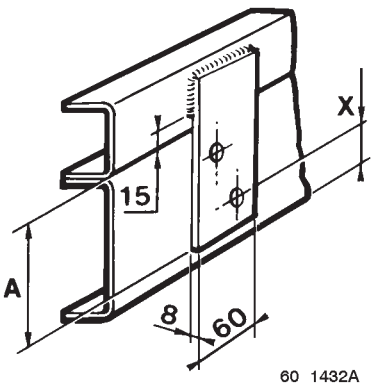
Lateral guiding must be assured by two guide plates. These are drilled and screwed to the sidemembers if they also fulfil the function of inertia stop.




60 2211A




60 2212A




60 1432A

For positioning the drillings to the guides, observe the sidemember drilling recommendations described in the chapter “Drilling of sidemembers”.

A: minimum support height, 3/4 of height (**h**) of the sidemember
B: minimum support height, 1/4 of height (**h**) of the sidemember

| X (mm) | Y (mm) | Z (mm) |
|---|---|---|
| 30 | 50 | 45 |

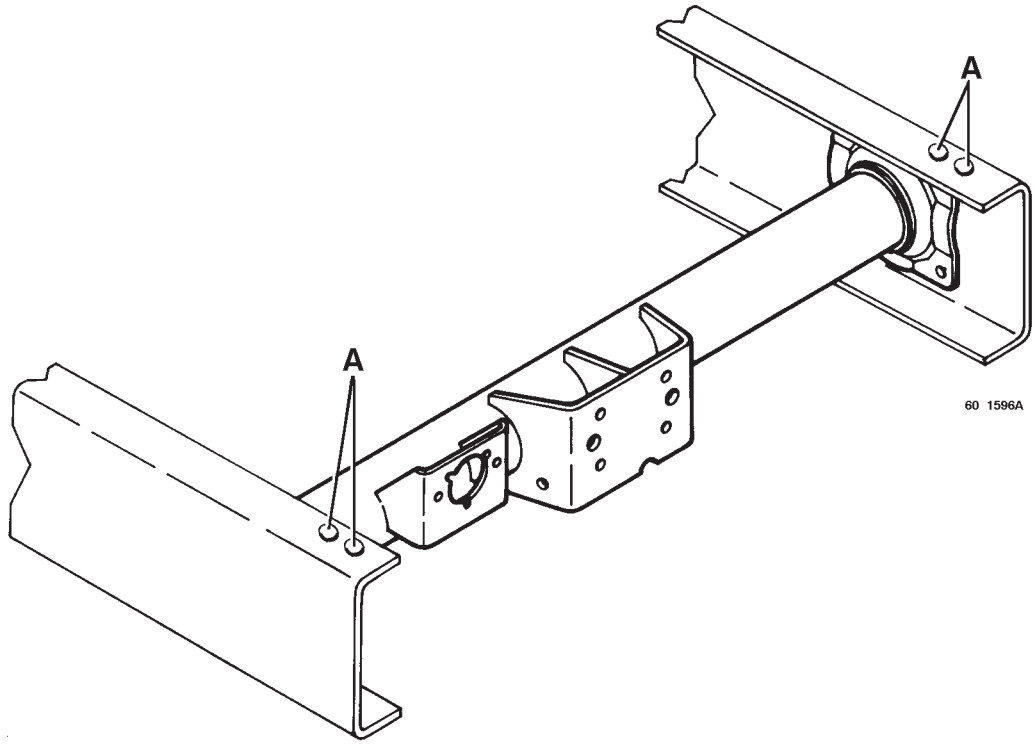
## 3.7 Inertia stops

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 screws type HM 10 x 125 Class 10.9,
4 nuts type DRH M 10 x 125 Class 10,
8 washers 10 x 22 x 3.
The use of nuts with nylon ring (e.g. Nyloc) are forbidden.

**NOTE**

The flanks of the tailgate may serve as inertia stops.

## 3.8 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.

## 3.9 Attachment of sub-frames to brackets

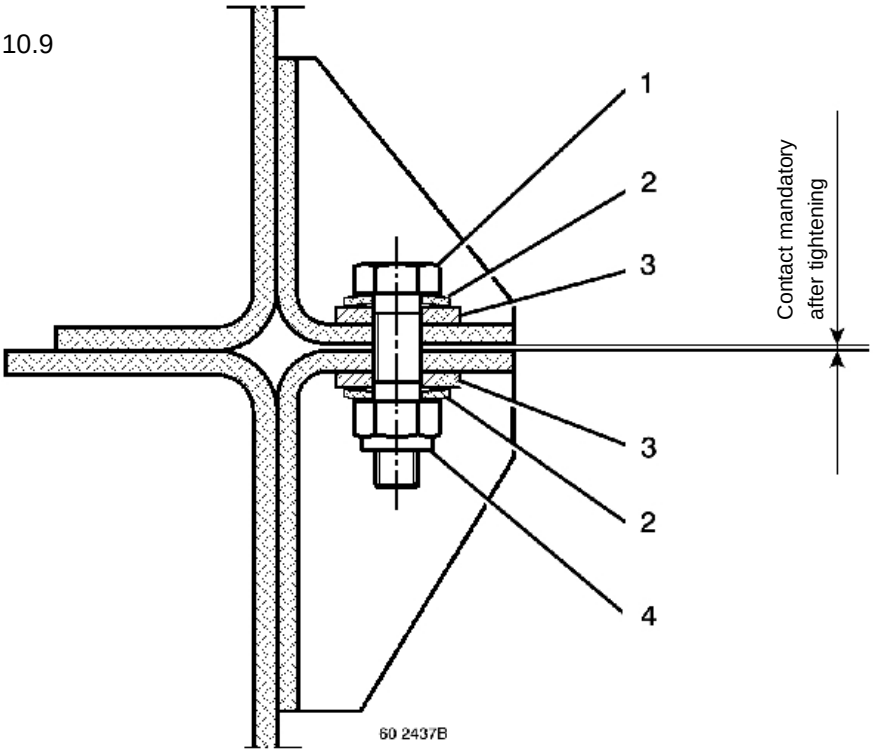
**- The use of brackets mounted in production on the chassis is compulsory.**

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

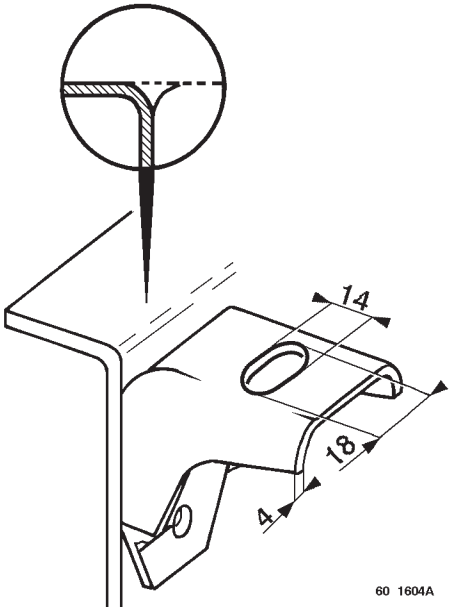
***IMPORTANT***
*Contrary to other series of our range, on the RENAULT MASCOTT the first bracket should be mounted by a rigid attachment, without fail.*

Rigid attachment
1 - Hexagon bolt M 12 x 125 x 50, class 10.9
2 - 2 plain 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)

**Tightening torque : 110 Nm**.




The brackets are flush with the sidemembers.



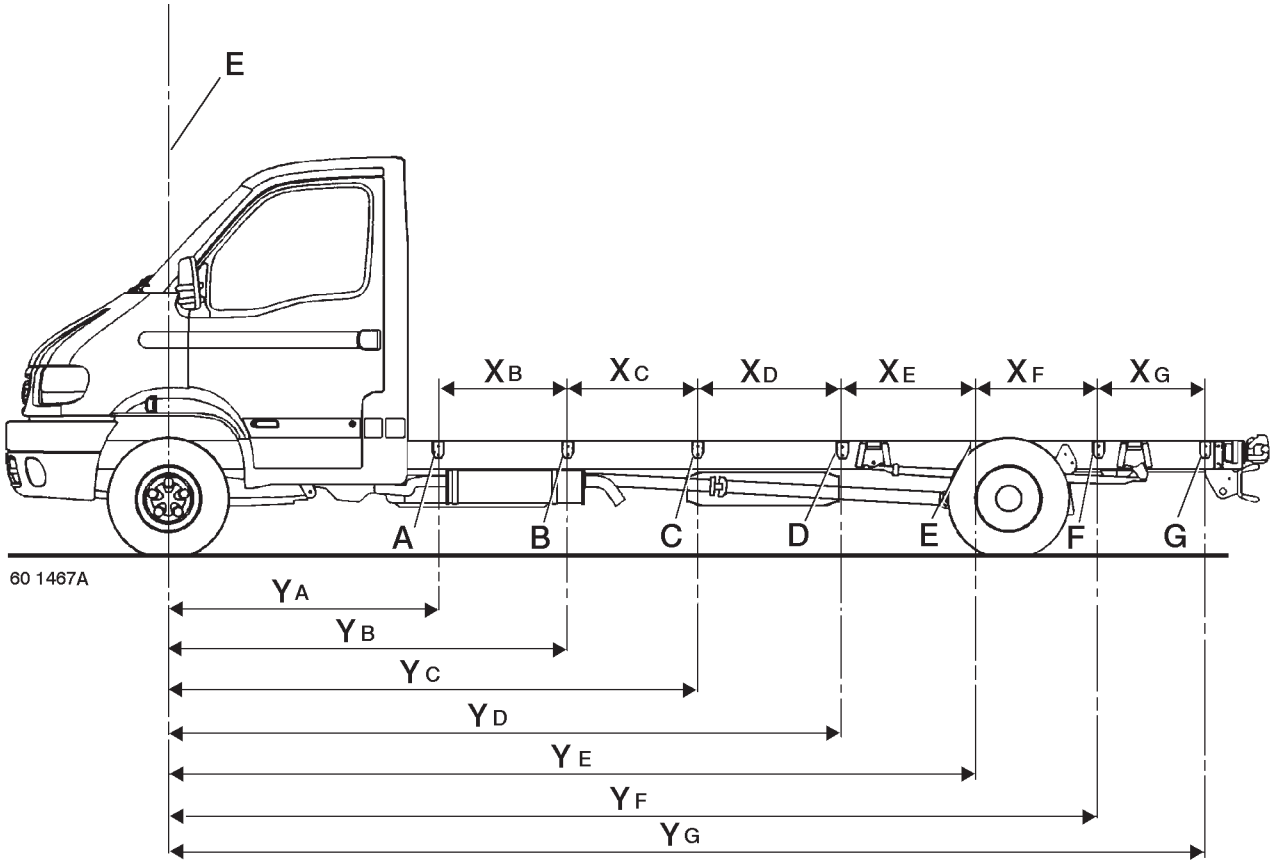

**Bodywork attachment kit**

Use the “Threaded hardware kit for fastening sub-frames to brackets” part N° 50 01 849 606 (available from the RENAULT TRUCKS Spare Parts department).

## 3.10 Longitudinal positioning of brackets on chassis

### 3.10.1 Single and double cabs

E - front axle centre-line




**NOTE**

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

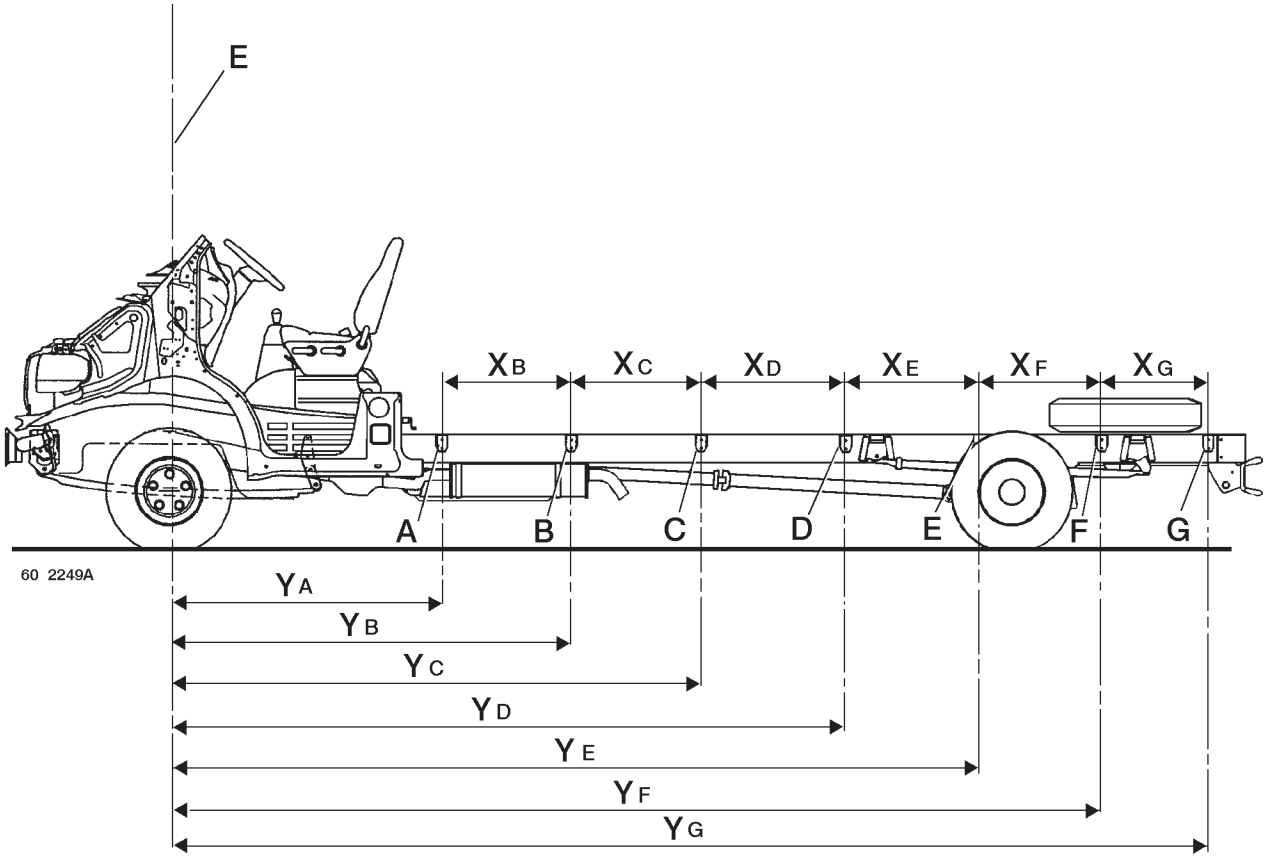
**Brackets positioning table**

- distance (**Yn**) between hthe bracket (**n**) and the front axle
- between-centres distance (**Xn**) between the bracket (**n**) and the previous bracket (the values (**Xn**) are given in brackets).

| Posiiton of the brackets | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cab type | Wheelbase | Brackets | | | | | | |
| | | A | B | C | D | E | F | G |
| Single cab | 3130 | 1550 | 2500 (950) | 3250 (750) | 4000 (750) | – | – | – |
| | 3630 single<br>3630 short<br>3630 long | 1550 | 2300 (750) | 3000 (700) | 3550 (550) | 4145 (595) | 4620 (475)<br>–<br>4800 (665) | – |
| | 4130 | 1550 | 2300 (750) | 2880 (580) | 3500 (620) | 4250 (750) | 5000 (750) | 5700 (700) |
| | 4630 | 1550 | 2300 (750) | 3060 (760) | 3710 (650) | 4460 (750) | 5110 (650) | 5760 (650) |
| Double cab | 3630 single<br>3630 short | 2300 | 3000 (700) | 3550 (550) | 4145 (595) | 4620 (475)<br>– | – | – |
| | 4130 | 2300 | 2880 (580) | 3500 (620) | 4250 (750) | 5000 (750) | 5700 (700) | – |

### 3.10.2 Chassis cowl

E - front axle centre-line

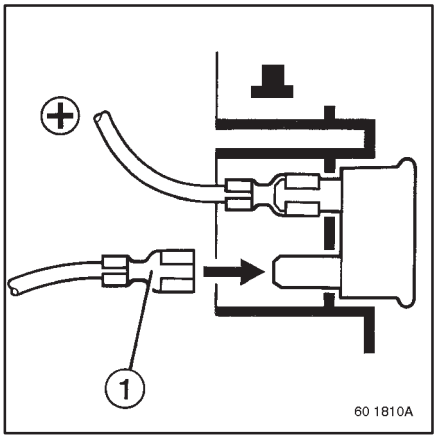



**Brackets positioning table**

- distance (**Yn**) between hthe bracket (**n**) and the front axle
- between-centres distance (**Xn**) between the bracket (**n**) and the previous bracket (the values (**Xn**) are given in brackets).

| Posiiton of the brackets | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Cab type | Wheelbase | Brackets | | | | | | |
| | | A | B | C | D | E | F | G |
| Chassis cowl | 3130 | 1550 | 2500 (950) | 3250 (750) | 4000 (750) | – | – | – |
| | 4130 | 1550 | 2300 (750) | 2880 (580) | 3500 (620) | 4250 (750) | 5000 (750) | 5700 (700) |
| | 4630 | 1550 | 2300 (750) | 3060 (760) | 3710 (650) | 4460 (750) | 5110 (650) | 5760 (650) |

# 4. ELECTRICAL PRE-ARRANGEMENTS




## 4.1 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/parking 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 informationb on electrical diagrams, consult workshop manual section MR 70.091 available from the RENAULT TRUCKS Spare Parts department.

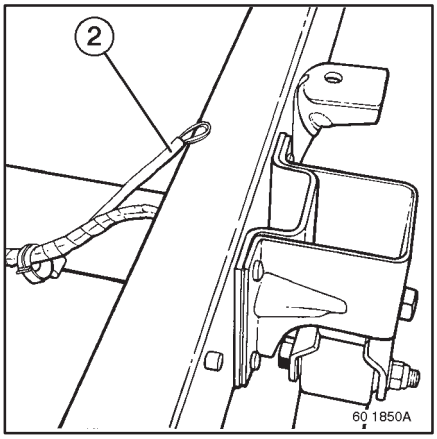
### 4.1.1 Available power supplies in the cab

The fuses assigned to this function are :
- F1 : battery “+”
- F3 : after ignition “+”.

Maximum permissible current: 10 Amps per line.

- Clip a wire fitted with a spade terminal ref. N° 77 03 497 183 (**1**) to the rear of the fuse/relay box on fuse F1 or F3 output.
- Fit in its place a 10 Amp flat fuse ref. N° 77 01 997 053.

### 4.1.2 Available power supplies on the chassis




**Available power supplies for connecting side/parking lamps to the bodywork**

For connecting side/parking lamps (marker lamps) to the bodywork, two wires (**2**) are provided in the chassis wiring harness.

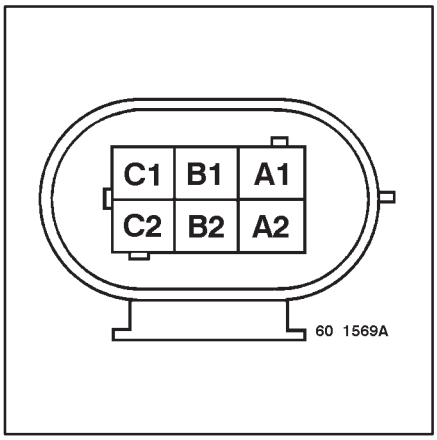
Assignment of the wires:
- blue wire: side/parking lights power supply
- black wire: earth

These wires have a section of 1 $mm^2$. They accept a maximum current of 5 Amps.
For connection, use insulated and adapted connections.

**Available power supplies in the engine compartment**

Assignment of black 6-way bodybuilder connector terminals (**1**) in the intermediate engine fuses / relays box (BIM):

- A1: battery “+” chassis available power supply
- B1: after ignition “+” chassis available power supply
- C1: earth
- A2: wire N° 17 crossing the front end not assigned
- B2: wire N° 18 crossing the front end not assigned
- C2: wire N° 19 crossing the front end not assigned

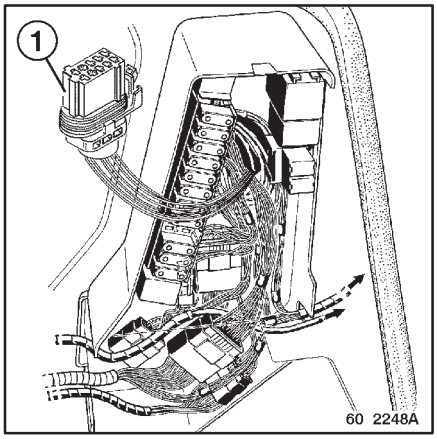



Wires N° 17, 18, 19 are to be used:
- for installation of the “Adaptation kit for electrical connection on chassis” (see following pages)
- for installations (control, information...) requiring the passage of wires through the front end.

In the cab, wires N° 17, 18, 19 with an approximate length of 20 cm, are enclosed in the strand of the wiring harness wires close to the front end wiring harness seal.

To connect up to the 6-way connector in the engine compartment, use:
- a female 6-way connector ref. N° 77 03 197 259,
- spade terminals ref. N° 50 00 812 492.

Provide a tight seal for the wiring harness using a sleeve with heat shrunk sheath. Heat the sheath with a hot air blowlamp to shrink it. The use of a tool giving off a naked flame is forbidden.




**Protection of available power supplies**

Fuse F3: after ignition “+” cab available power supply
Fuse F1: battery “+” cab available power supply
Fuse F25: after ignition “+” chassis available power supply
Fuse F21: battery “+” chassis available power supply

Maximum permissible current: 10 Amps per line.

**Connection of rear signalling devices to the chassis wiring harness**

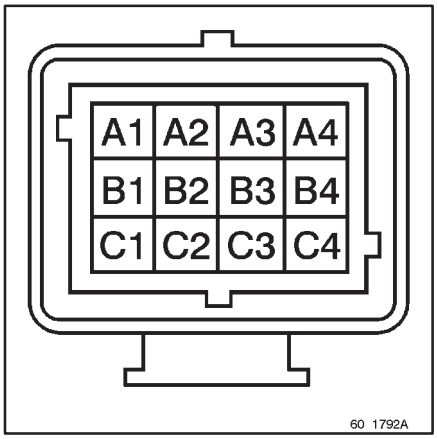
For connecting up signalling devices to the rear of the chassis, the installer can make an electrical tapping on the chassis wiring harness. This tapping can be made either:
- by connecting up to the trailer wiring harness connector in the absence of a towing device,
- or by making off-branches to the 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 tight seal for the wiring harness using a sleeve with heat shrunk sheath. Heat the sheath with a hot air blowlamp to shrink it. The use of a tool giving off a naked flame is forbidden.*

**Procurement :** (Available from the RENAULT TRUCKS Spare Parts Department)
- connector ref. N° 77 03 197 816.
- spade terminals ref. N° 50 00 812 493.

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

- terminal A1 : trailer LH side/parking lamp (F27 - 7.5 A)
- terminal A2 : trailer RH side/parking lamp (F24 - 7.5 A)
- terminal A3 : earth
- terminal B1 : trailer LH flashing lamp (F42 - 15 A)
- terminal B2 : trailer RH flashing lamp (F42 - 15 A)
- terminal B3 : reversing lamp (F34 - 20 A)
- terminal C1 : trailer stop lamp (F13 - 10 A)
- terminal C2 : trailer fog lamp (F11 - 7.5 A)
- terminals A4, B4, C3, 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 ref. N° 77 00 377 037 by a flasher unit ref. N° 77 00 377 199 available from the RENAULT TRUCKS Spare Parts Department.*

## 4.1.3 Adaptation kit for electrical connection on chassis

The “RENAULT MASCOTT” vehicle is pre-arranged to accomodate a bodybuilder adaptation kit ref. N° 50 01 850 529 supplied by the RENAULT TRUCKS Spare Parts department.

The use of this kit makes for simple and speedy fitting of an electrical installation controlled by switches housed in original locations in the dashboard.

The employment of this kit has the advantage of using the original vehicle wiring harness for passing through the front end of the cab, improving ease and quality of assembly by eliminating problems of routing and sealing between chassis and cab.

This installation is designed to accept a maximum current of 10 Amps. For a higher amperage, make an electrical installation on the chassis side featuring a relay where the power circuit must be connected to the battery terminals and protected by a fuse.

***IMPORTANT***
*The electrical power supply for the kit is ensured by fuses of the available power supplies in the cab (F1 and F3). The maximum permitted amperage for these fuses is 10 Amps. In the event of connection of receivers in the cab and for the kit in parallel, it is necessary to calculate the total amperage crossing the fuses and check that it is less than 10 Amps. If the total amperage is higher, make an electrical installation on the chassis side featuring a relay where the power circuit must be connected to the battery terminals and protected by a fuse.*
*It is forbidden to modify fuse ratings.*

**To install the kit, it is necessary to order:**

- 1 switch bracket (ref. N° 77 00 351 884)
- 2 electrical switches with built-in warning lights (ref. N° 77 00 351 972).

**Make-up of the kit** (ref. N° 50 01 850 529)

- 1 wiring harness
- 1 male 6-way connector
- 2 female 6-way connectors
- 4 terminal lugs (blade type)
- 2 terminal lugs (clip type)
- 1 male terminal lug for 2 $mm^2$ wire
- 1 female terminal lug for 2 $mm^2$ wire
- 1 heat shrunk sheath sleeve
- 5 glue sleeves
- 2 fuses (10 Amps)
- 2 self-adhesive stickers

**Installation of adaptation kit for electrical connection**

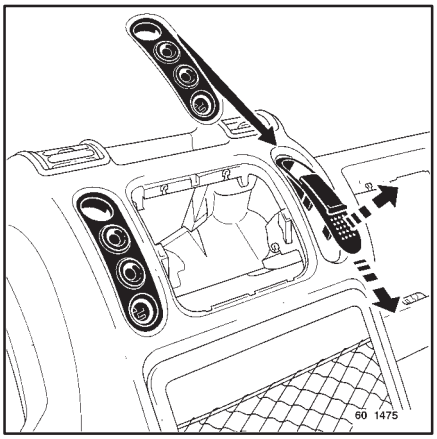
**Warning**

Prior to any work on the electrical circuit, disconnect the battery, starting with the earth terminal.
The bodybuilder adaptation kit must not be modified whatever the circumstance.
The maximum permissible current for the kit is 10 Amps.

**In cab**

Remove the ashtray and the heating control panel.
Remove the blanking plugs from the locations left available for switches. In the absence of available locations, replace the writing pad bracket by the switch bracket.

Remove the writing pad bracket: push the catches (**A**) and free the lower part of the bracket. Then pull the bracket downwards to remove.

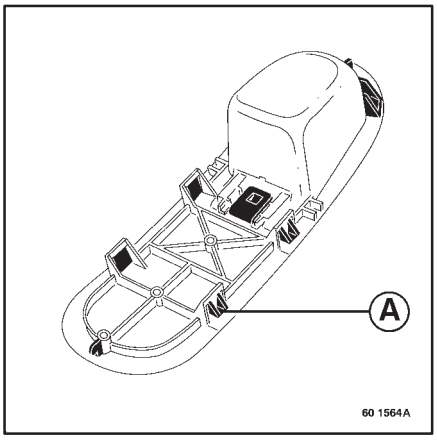


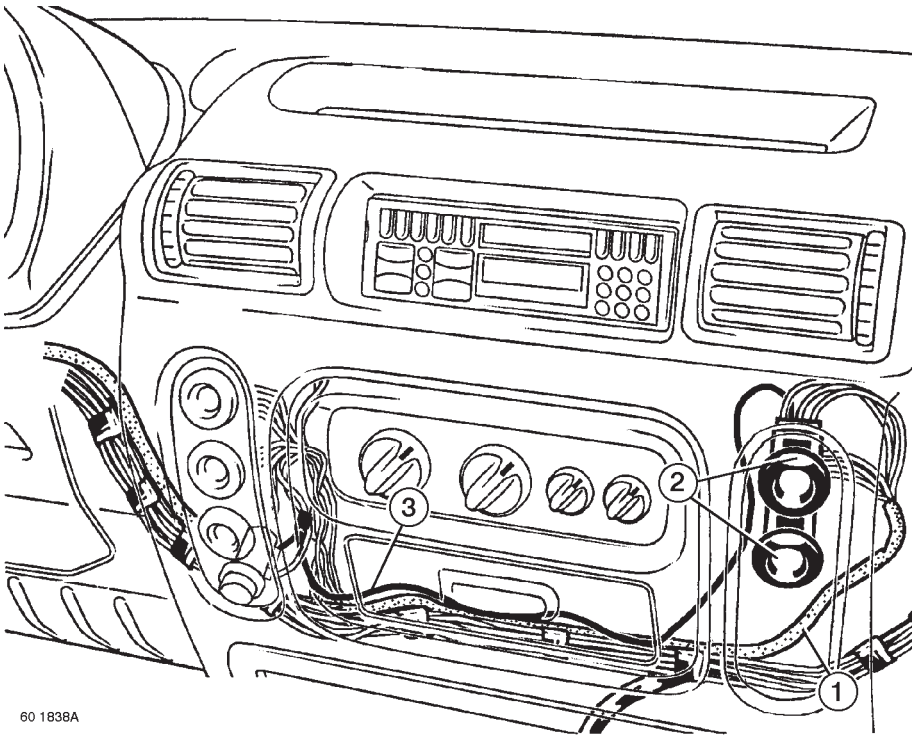

Connect the wiring harness from the kit to the two switches (**2**).
Route the wiring harness as far as the fuses/relays box.
Fasten the wiring harness using nylon clamps on fixed bases.

Remove the switch bracket bearing the cigar lighter.

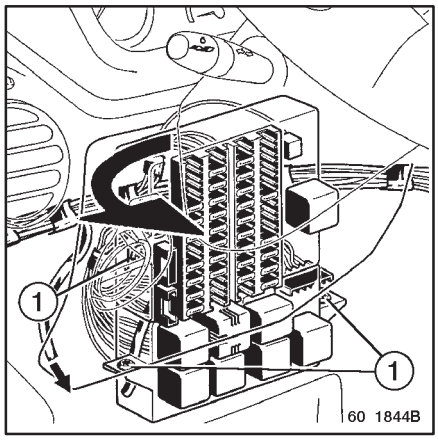
Connect the blue wires from the kit to the cigar lighter.

Depending on the version, see the two possible assemblies (**A-B**) on the diagrams on the following pages.

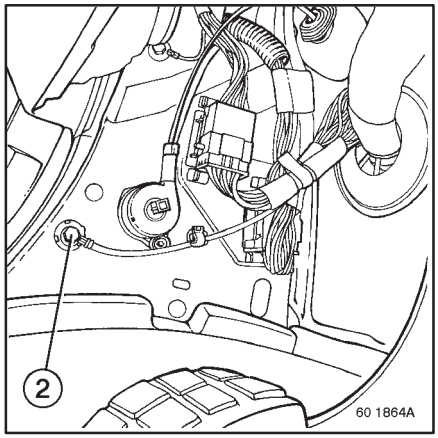


Remove the screws (**1**) fastening the fuses/relay box and turn the box.
Clip the red wire into the available pocket of the location for fuse F1.
Clip the yellow wire into the available pocket of the location for fuse F3.



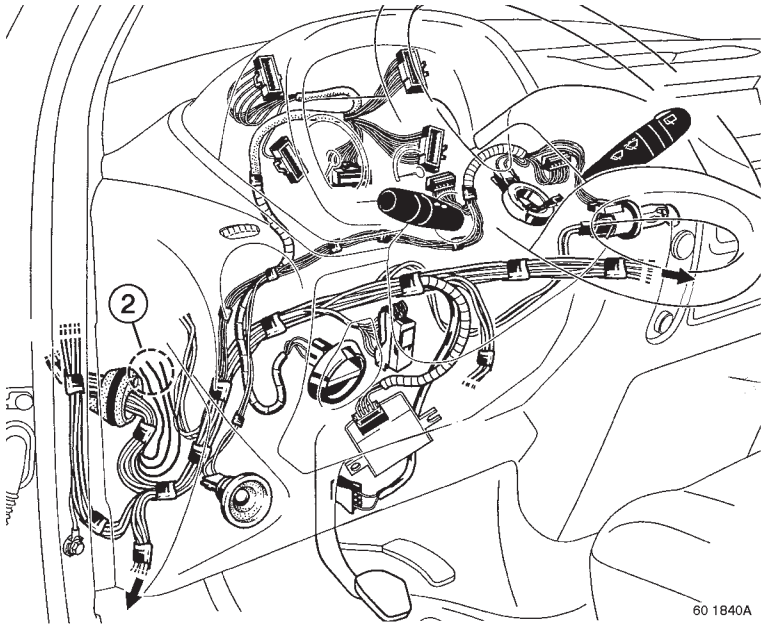

Connect the black wire in the wiring harness to the cab earth (**2**) screwed into the LH front pillar.




In the cab, wires N° 17, 18, 19 (**2**), about 20 cm long, are enclosed in the strand of the wiring harness wires close to the front end wiring harness seal.
Place the terminal lugs in position on the three wires crossing the front end and clip them into the male 6-way connector:
- wire N° 17 in pocket A1,
- wire N° 187 in pocket B1.

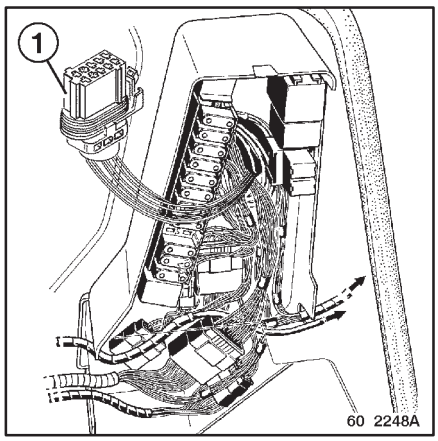
Wire N° 19 can be connected to the 6-way connector in the case where an extra electrical line is needed.
Connect the wiring harness wires from the kit to the female 6-way connector:
- green wire to terminal A1,
- brown wire to terminal B1.

Plug in the two 6-way connectors and fasten them to the vehicle wiring hanress.

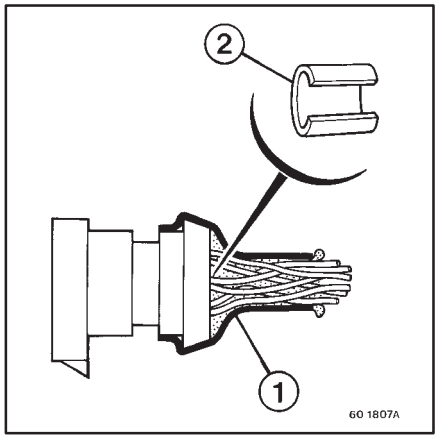


**On chassis**

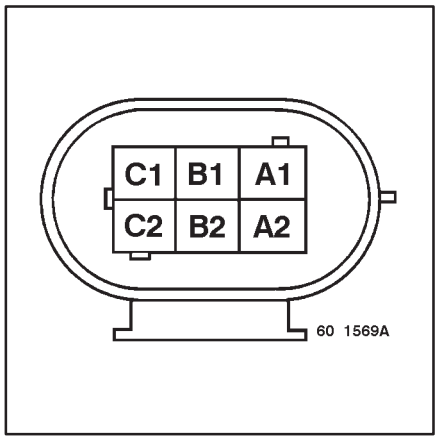
Make the chassis wiring harnessto be plugged into the 6-way connector (**1**) located in the intermediate engine fuses / relays box (BIM).




Use the female 6-way connector, blade type terminal lugs, heat shrunk sheath sleeve (**1**) and glue sleeves (**2**) provided in the kit. The glue 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 hermetically sealed sheath over their entire length.
Use electrical wire and sheath resistant to a temperature of 120°C.




Assignment of the 6-way connector terminals in the ntermediate engine fuses / relays box (BIM):
- A1: battery “+” chassis available power supply
- B1: after ignition “+” chassis available power supply
- C1: earth
- A2: battery “+” switch output (wire N° 17)
- B2: after ignition “+” switch output (wire N° 18)
- C2: wire crossing the front end (wire N° 19: not used)




In the case of receivers consuming a current of more than 10 Amps, install relays protected by fuses.

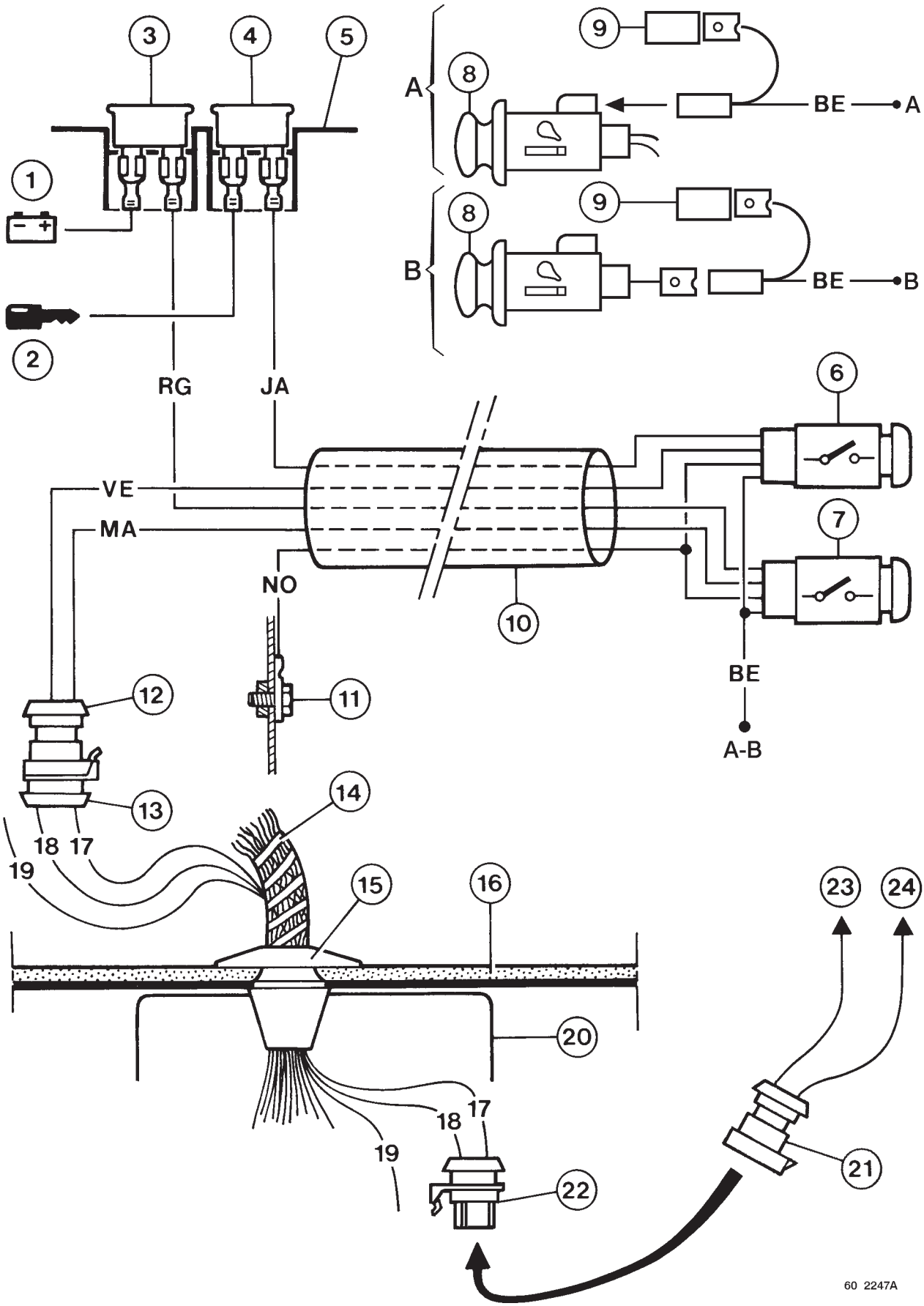
The extra chassis wiring harness must follow the routing of the vehicle chassis wiring harness.

Watch that the wiring harness is not submitted to any stress. If necessary, make holes and low points for the evacuation of any water that might ingress into the wiring harness.

The kit allows electrical assemblies other than those described earlier (e.g. control circuit upon closure of earth).

These assemblies are authorized insofar as they meet the previously quoted assembly, connecting arrangement and maximum amperage recommendations and provided that they are effected according to standard trade practice.

**Wiring diagram**



**Key to diagram**

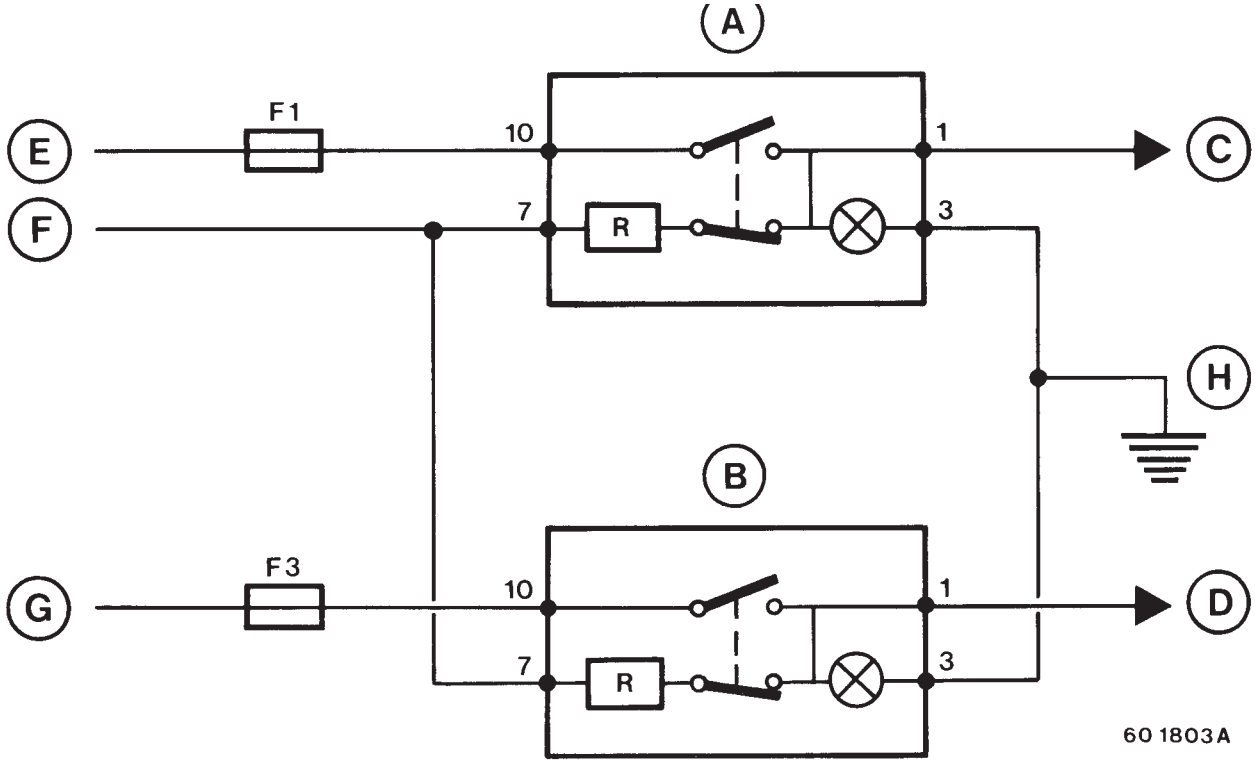
1 - fuse F1 power supply (battery “+”)
2 - fuse F3 power supply (after ignition “+”)
3 - fuse F1
4 - fuse F3
5 - fuses/relays box (BFR)
6 - switch N° 1
7 - switch N° 2
8 - cigar lighter (depending on option)
9 - cigar lighter lighting power supply line
10 - wiring harness sheath
11 - cab earth
12 - male 6-way connector
13 - female 6-way connector
14 - cab wiring harness
15 - seal
16 - cab front
17 - wire N° 17
18 - wire N° 18
19 - wire N° 19
20 - intermediate engine fuses / relays box (BIM)
21 - female 6-way connector for equipment wiring harness
22 - male 6-way connector on vehicle wiring harness
23 - to equipment item N° 1
24 - to equipment item N° 2

**Colour of kit wiring harness wires**

BE - blue
JA - yellow
MA - brown
NO - black
RG - red
Ve - green.

**Schematic diagram (detail of switches internal circuit)**

A - switch with built-in warning lamp and lighting
B - switch with built-in warning lamp and lighting
C - to equipment item N° 1
D - to equipment item N° 2
E - battery “+” power supply
G - after ignition “+” power supply
H - cab earth



# 5. BEHIND-CAB HANDLING CRANES

## 5.1 Crane maximum lifting capacity

| GVW (kg) | Lifting couple (tonne.metre) |
|---|---|
| 3 500 | 3 |
| 5 000 / 5 500 / 6 000 | 4,5 |
| 6 500 | 5 |

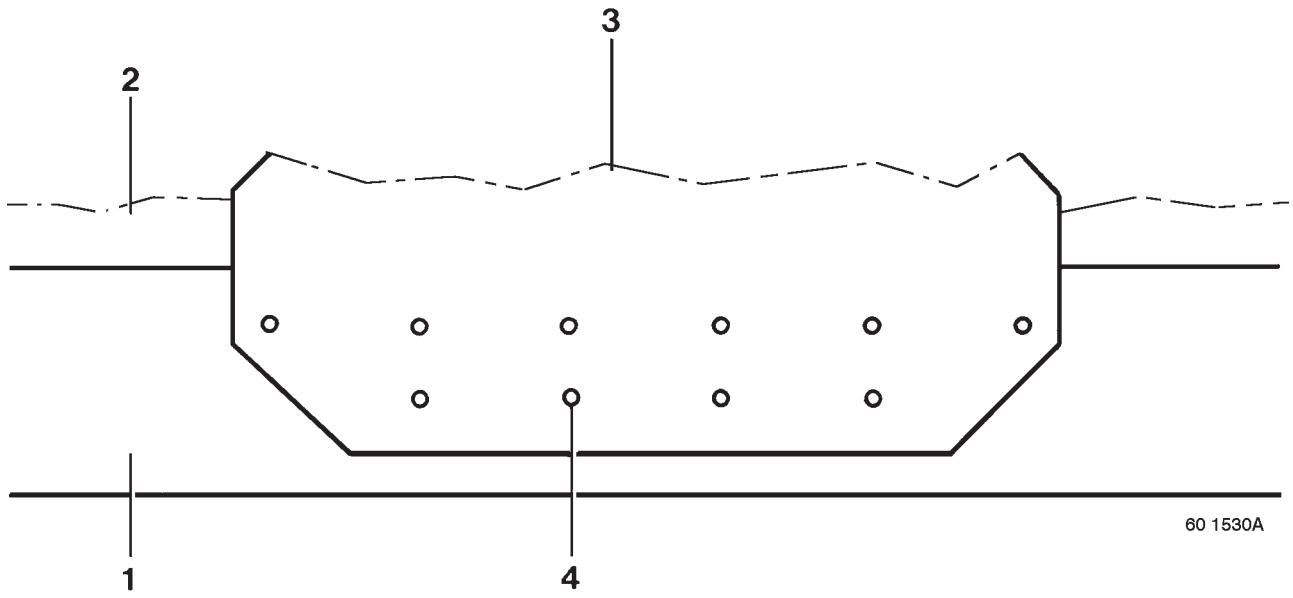
## 5.2 Sub-frame specific to cranes

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).

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.

## 5.3 Attachment of sub-frame

**Fastening by bolted plates**
It is advised, insofar as possible, to privilege fastening by bolted plates rather than fastening by clamps in the crane seating zone.
1 - Chassis
2 - Specific sub-frame
3 - Fixing plate with same thickness as the sidemember
4 - Fastening by at least 9 nuts and bolts.

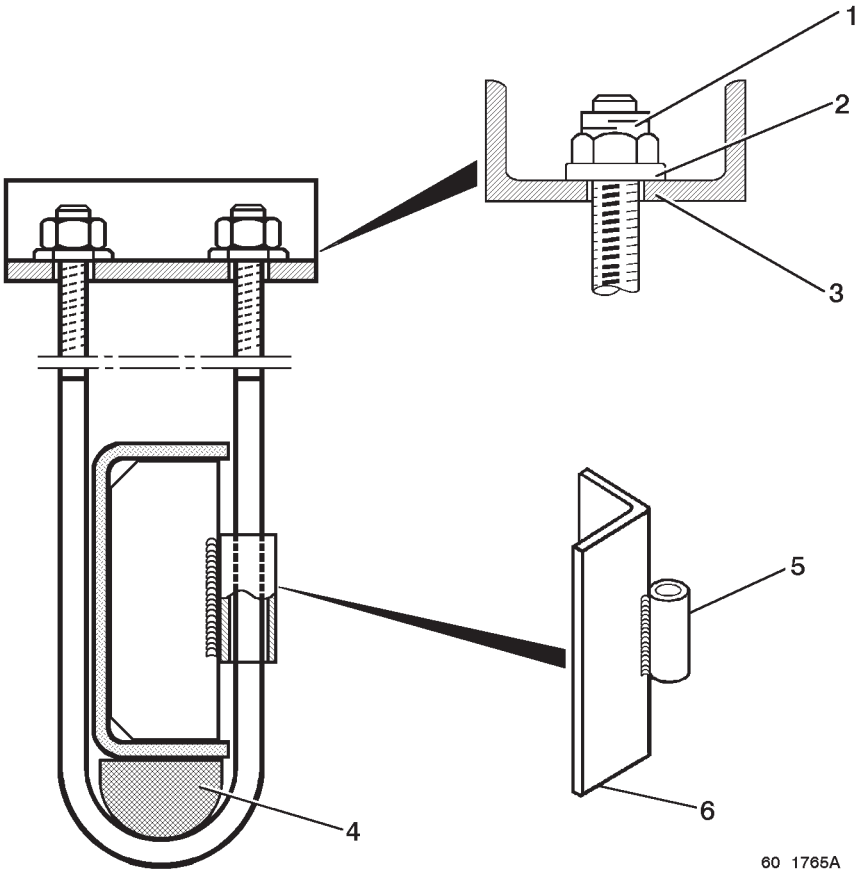



**Nut and bolt hardware:**
- bolts HM 10 x 125 - class 10.9
- DRH (flanged) nuts M 10 x 125 - class 10.
- plain washer 10 x 27 x 3.

The use of nuts with nylon ring (e.g. Nyloc) is forbidden.
Welding of the fixing plate to the chassis is forbidden.

**Attachment by clamps (assembly example)**

1 - DRH (flanged) nut M 10 x 125 - class 10
2 - plain washer 10 x 27 x 3
3 - “U” channel section
4 - round intermediate shim
5 - holding barrel welded to spacer
6 - spacer




**Assembly precautions**

Progressive and alternate tightening so as not to distort the sidemember flanges.
The fastening of sub-frames by clamps requires the fitting of spacers (**5-6**) opposite each clamp.
The spacers must compulsorily be connected to the U-bolt (holding barrel) so as to avoid any relative movement between the two parts.
The assembly of a round section U-bolt requires the use of a shim (**4**) featuring a rounded U-bolt holding impression marrying its curvature.
The maximum play between the spacers (**5-6**) and the internal faces of the sidemember should not exceed 1 mm.

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

# 6. TAIL LIFTS

Maximum tail lift lifting capacity: 500 kg.

## 6.1 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 mm4 and meeting the recommendations described in the “Sub-frame” chapter.

## 6.2 Fastening

The tail lift is to be fastened by bolted plates. In all cases, the design should involve the body sub-frame. The plates are to be fastened on each side by 6 nuts and bolts on the chassis and 3 nuts and bolts or welding on the sub-frame.

Posiiton 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 aprt to avoid any sliding of the plate in relation to the side-members.

If necessary, it will be worthwhile to wedge the tail lift beam or plate on the lower flange of the chassis side-member to avoid flexure of the sideembers.

**NOTE**

Do not weld bolted plates to the chassis.

Threaded hardare:
- Hexagon bolts M 10 x 125 - class 10.9
- DRH (flanged) nuts M 10 x 125 - class 10
- Plain washers 10 x 27 x 3.

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

**WARNING**

In all cases, of adaptation of a lift gate, it is essential to calculate the new body length, while observing:
- the gross vehicle weight (GVW),
- the minimum front axle load, vehicle fitted with body and equipped with tail lift,
- maximum authorized front and rear axle loads,
- maximum rear overhang indicated in the Type Approval department descriptive notice and the bodybuilder’s 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).

# 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

If the vehicle is not equipped with an air conditioner, 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. It consists of:

- a track for a 6-rib belt for driving engine equipment (alternator, water pump),
- a track for a 5-rib belt for driving additional equipment.

To replace the crankshaft pulley, refer to engine workshop manual MR 20.651.

The equipment must be positioned in the location provided for the air conditioning compressor.

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 three tapped holes.
- Assembly on alternator and air conditioning compressor bracket. This solution is advantageous to the layout of the drive belt tensioner roller and provides 4 fastening points for the support bracket.

**Procurement**

- 1 pulley damper for engine PTO version ref. N° 50 10 284 987
- 1 belt type POLY-V 5K whose mength is to be deteermined according to the equipment pulley diameter.

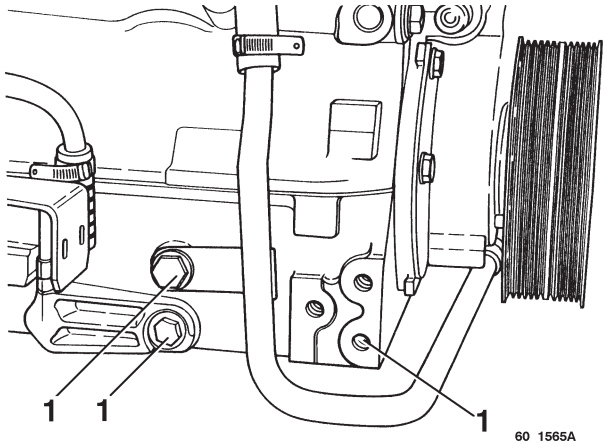
For assembly to the air conditioning compressor bracket only:
- 1 alternator and air conditioning compressor bracket ref. N° 50 10 284 903
- 1 belt tensioner roller unit ref. N° 50 10 284 918
- 1 collar screw ref. N° 50 03 002 026
- 1 collar screw ref. N° 50 03 002 021
- 1 screw ref. N° 50 03 101 714
- 1 nut ref. N° 50 03 032 251
- 1 collar screw 10 x 125 x 65 ref. N° 50 03 002 062
- 2 collar screws 10 x 125 x 25 ref. N° 77 03 002 290.

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

**Fastening the equipment bracket to the engine block**

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

Screw-thread: M 10 x 125



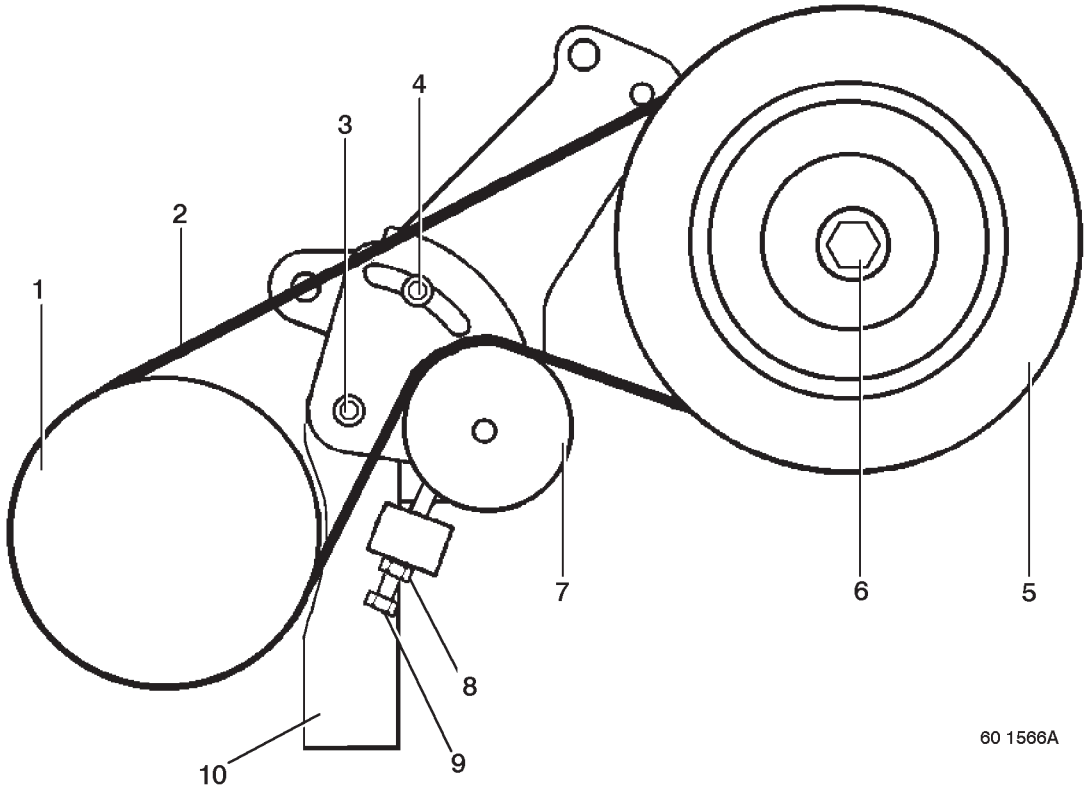

**Fastening the equipment bracket to the alternator and air conditioning compressor bracket**

**Assembly recommendations (see next page)**

Disconnect the battery.
Remove the soundproofing screens.
Remove the alternator from its bracket.
Save the alternator belt tensioner roller and its fastenings.
Install the alternator belt tensioner roller and its fastenings, the tensioner roller (**7**) and its fastenings **(3-4-8-9)** on the alternator and air conditioning compressor bracket. Assemble the bracket / alternator unit to the engine.
Install the equipment bracket to the alternator and air conditioning compressor bracket. Install the equipment to its bracket.

**Key**

1 - PTO pulley
2 - drive belt POLY-V 5K
3 - collar bolt HM8 x 125 x 16 (ref. N° 50 03 002 026)
4 - collar bolt HM8 x 125 x 30 (ref. N° 50 03 002 021)
5 - engine pulley (ref. N° 50 10 284 987)
6 - crankshaft pulley setscrew (tightening torque: 200 Nm)
7 - tensioner roller (ref. N° 50 10 284 918)
8 - nut M8 (ref. N° 50 03 032 251)
9 - setscrew HM8 x 125 x 55 (ref. N° 50 03 101 714)
10 - alternator and air conditioning compressor bracket (ref. N° 50 10 284 903)



## 1.2 Gearbox-mounted PTO

The gearbox-mounted PTO (optional assembly on new vehicle) is equipment that can be adapted in the aftermarket 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 20Z1 (ZF 5 S 200 gearbox): 120 Nm
- PTO 20Z2 (ZF 6 S 300 gearbox): 180 Nm

Weight:
- PTO 20Z1: 6 kg
- PTO 20Z2: 6 kg

Drive ratio in relation to engine rotating speed:

20Z1 = 1
20Z2 = 0.91

Attachment of receiver to PTO by 4 setscrews.
For assembling different output shafts, consult the PTO manufacturer.

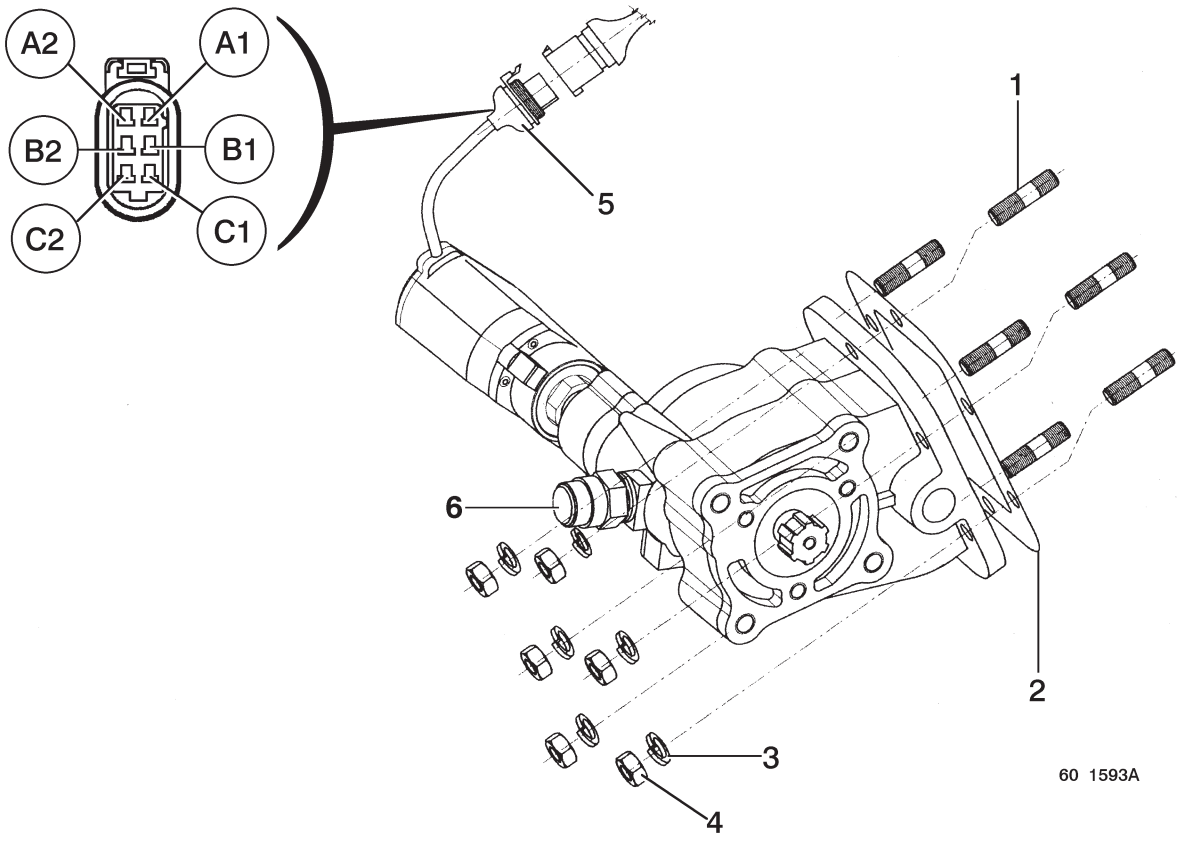
**Important**

The PTO can only operate if is controlled by the PTO safety box and if the box is connected upon according to the assembly stated in this document.
It is subsequently forbidden to make electrical connections other than those recommended in the present document.

**Procurement** (parts available from the RENAULT TRUCKS Spare Parts Department.
- PTO 20Z1 (ZF gearbox ZF 5 200) ref. N° 50 10 245 565
- PTO 20Z2 (ZF gearbox ZF S 200) ref. N° 50 10 245 566
- PTO safety box ref. N° 77 00 377 201
- control switches ref. N° 77 00 377 205
- PTO wiring harness to gearbox ref. N° 77 00 377 221
- flat 10 Amp fuse ref. N° 77 01 998 053.

**Installation on gearbox**

Drain the oil from the gearbox.
Remove the gearbox closing plate.
Carefully clean the joint face.
Screw the studs (**1**) into the gearbox casing and tighten at a torque of 15 Nm.
Install the gasket (**2**), PTO, washers (**3**) and nuts (**4**).
Tighten the nuts (**4**) at a torque of 37 Nm.
Fill the gearbox with oil: consult the driving and servicing handbook.




Assignment of connector terminals (**5**), face view:
A1 - Electric motor tripping earth
B1 - “Running” position limit switch contact
C1 - “Stop” position limit switch contact
A2 - Electric motor tripping power supply
B2 - “Running” position limit switch contact
C1 - “Stop” position limit switch contact

Connector (**6**): PTO switch contact

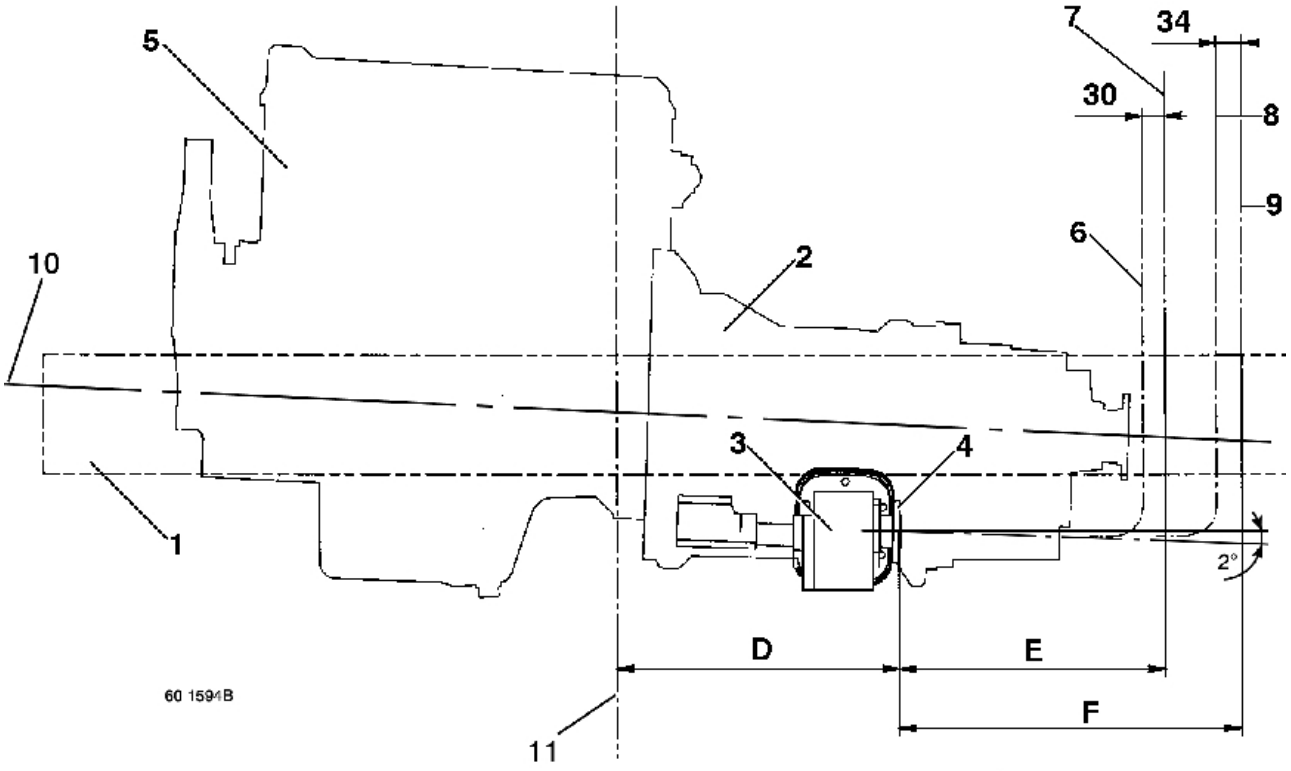
**Positioning on vehicle (tolerance: ± 2 mm)**

A - Output flange horizontal between-centres distance - vehicle longitudinal centre-line
B - Output flange horizontal between-centres distance - sidemember flange edge
C - Output flange vertical between-centres distance - sidemember flange edge
D - Output flange between-centres distance - front axle centre-line
E - Output flange between-centres distance - short cab rear end
F - Output flange between-centres distance - long cab rear end

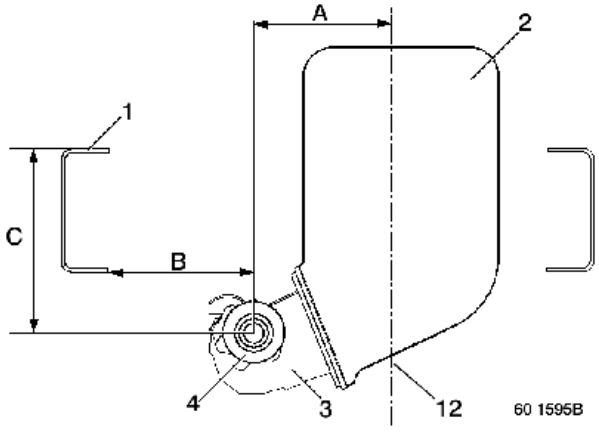
* thickness 4 mm
** thickness 5 mm

| Gearbox type | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| **S5 – 200** | 166.1 | 202.9 | 222.7*<br>223.7** | 377 | 1023 | 1773 |
| **S6 – 300** | 186.5 | 182.5 | 241.3*<br>242.3** | 386 | 1014 | 1764 |

Dimensions given in mm

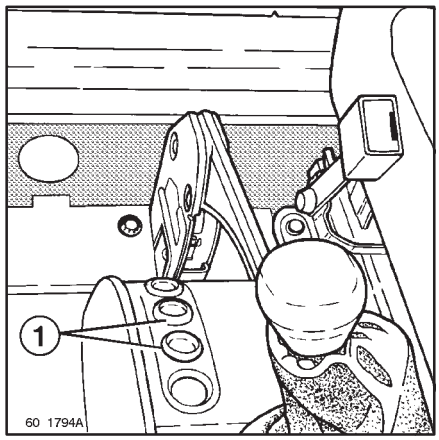



1 - LH sidemember
2 - Gearbox
3 - Power take-off
4 - PTO output flange
5 - Engine
6 - Short cab rear end
7 - Short cab body start
8 - Long cab rear end
9 - Long cab body start
10 - Power unit centre-line
11 - Front axle centre-line
12 - Vehicle centre-line

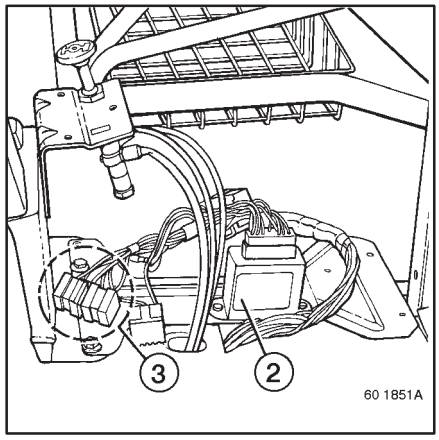


**Assembly of cab components**

Remove the central console.
Install the two switches (**1**) o, their housings in the console.



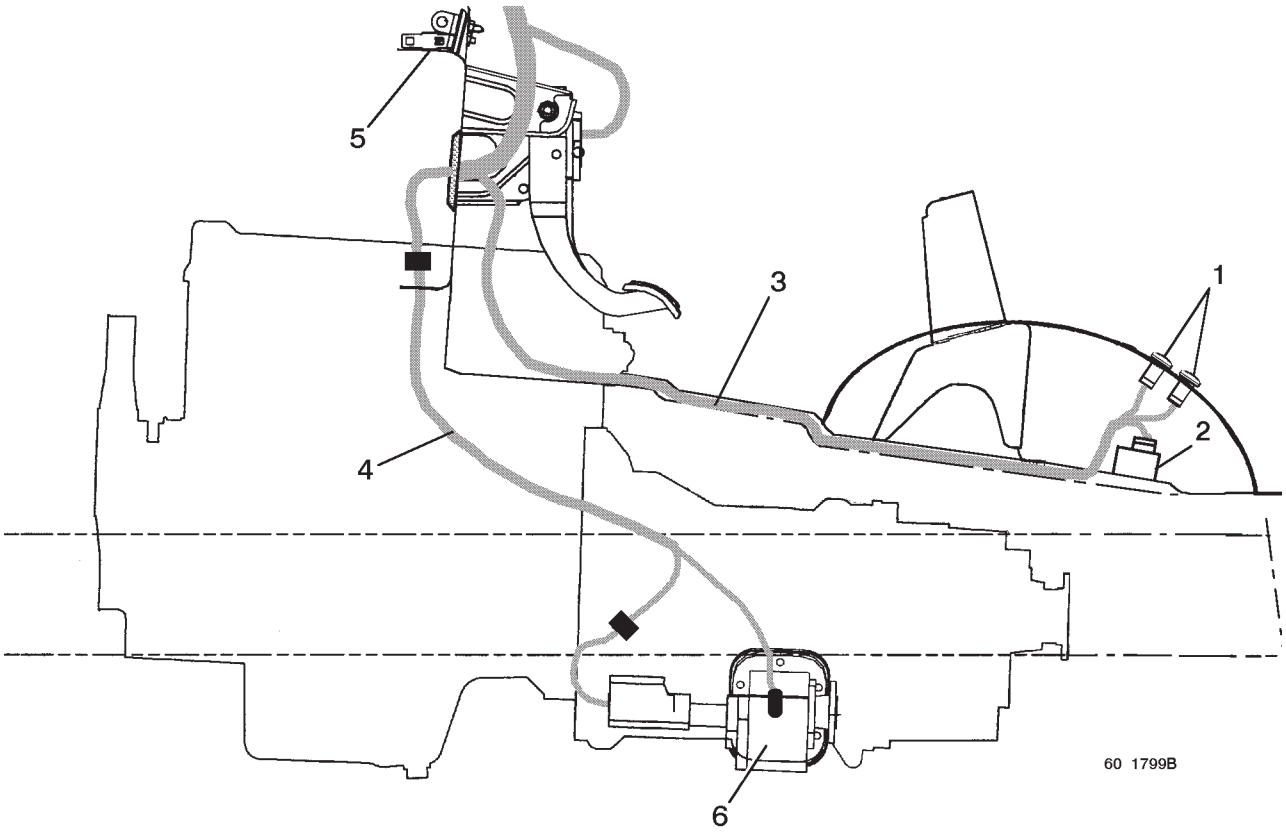

Fasten the safety box (**2**) to the floor with two screws.
Connect the switches and the safety box to the connectors (white in colour) from the cab wiring harness provided for this purpose.
Reassemble the central console.
Fit a 10 Amp flat fuse in the fuse location F2 if the fuses/relays box (BFR).




**Assembly of wiring harness to chassis**

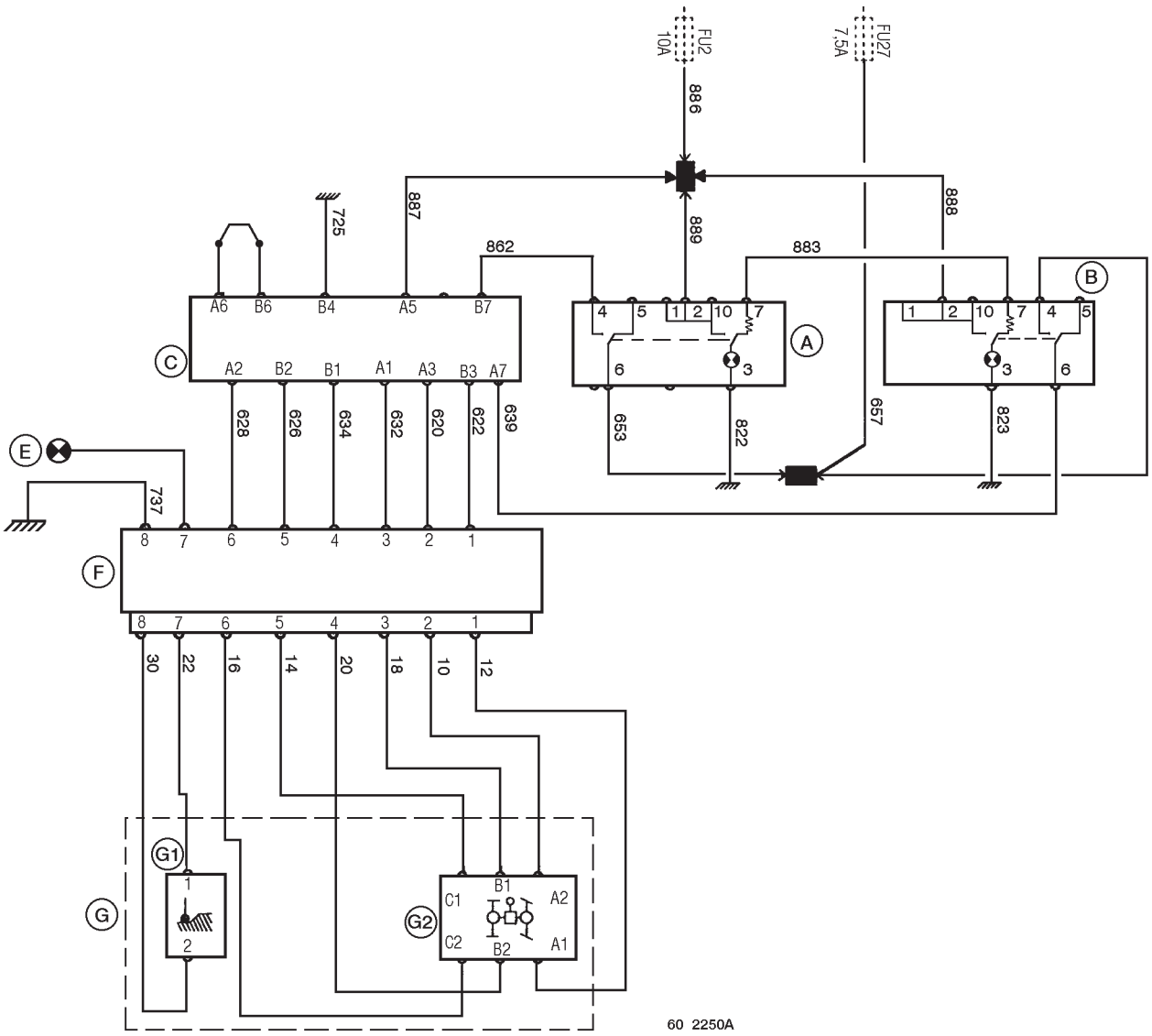
Position the PTO wiring harness on the gearbox and connect it:
- to the cab wiring harness connector in the intermediate engine fuses / relays box (BIM),
- to the two PTO connectors.

## Electrical installation diagram




1 - PTO control switches
2 - PTO safety box
3 - cab wiring harness
4 - PTO wiring harness
5 - intermediate engine fuses / relays box (BIM)
6 - PTO

## Electrical diagram



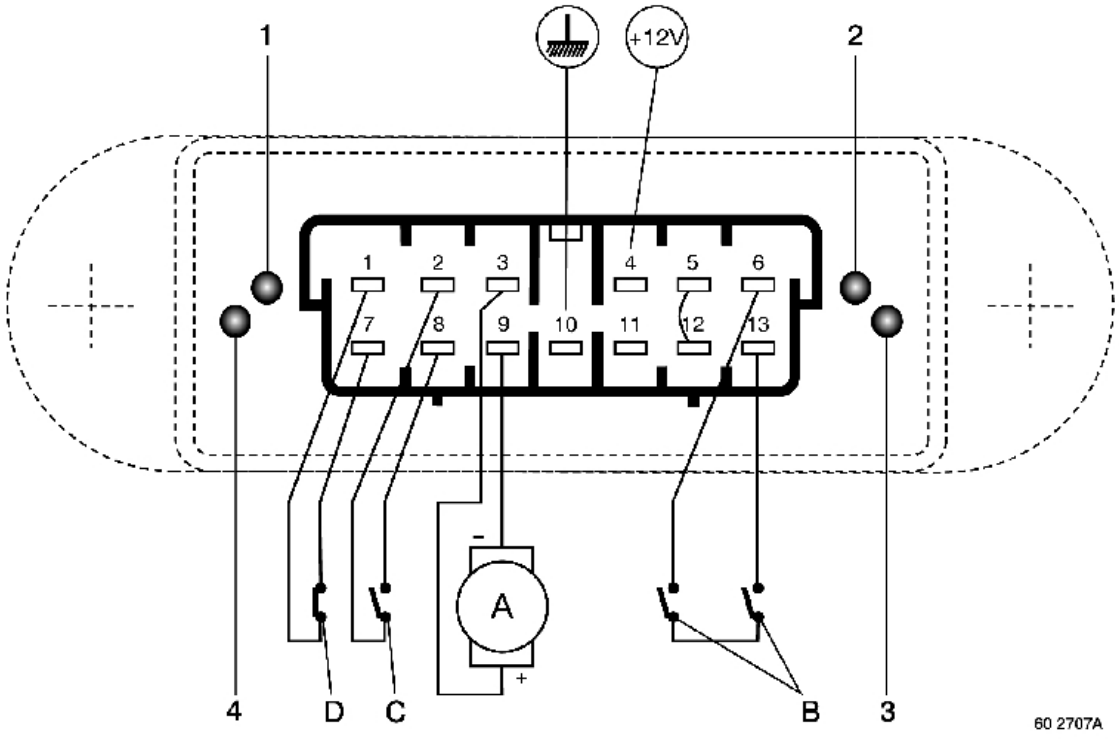

**Key to diagram**

A - PTO control switch
B - PTO control switch
C - PTO safety box
D - clutch pedal position sensor (electronic injection versions only)
E - PTO warning light
F - cab wiring harness hook-up connector - PTO wiring harness
G - power take-off
G1 - PTO switch contact
G2 - PTO 6-way connector

**Note**

It is possible to ad an operating safety device between terminals A6 and B6.
When A6 and B6 are open, the PTO will not function.

## PTO electronic box




1 - Dog clutch release warning light (orange)
2 - Dog clutch engagement warning light (orange)
3 - Shunt presence between terminal 5 and terminal 12 warning light (green), of no interest for operation (always illuminated)
4 - 12V+ power supply (battery) warning light (red)

A - Actuator (motor)
B - Control switches
C - Dog clutch release limit switch
D - Dog clutch engagement limit switch

- The orange diodes never light up simultaneously. If there is a tooth gap, the orange diode may be illuminated but the dashboard warning light is not lit.
- Terminals 3 and 9 polarize differently according to the direction of rotation of the motor.
- The contacts are closed in the “dog clutch engaged” and the “dog clutch released” positions.
- The voltage at the actuator terminals is 7 Volts.

**Actuator**
- The polarized motor pushes with a worm screw.
- The motor has 2 limit switch stops (the box cuts the power supply at the end of travel).

Never supply power directly to the motor- destruction would be immdiate.

**Control switches :**
- Two switches with built-in warning lights are assembled as standard to avoid accidental engagement of the dog clutch.

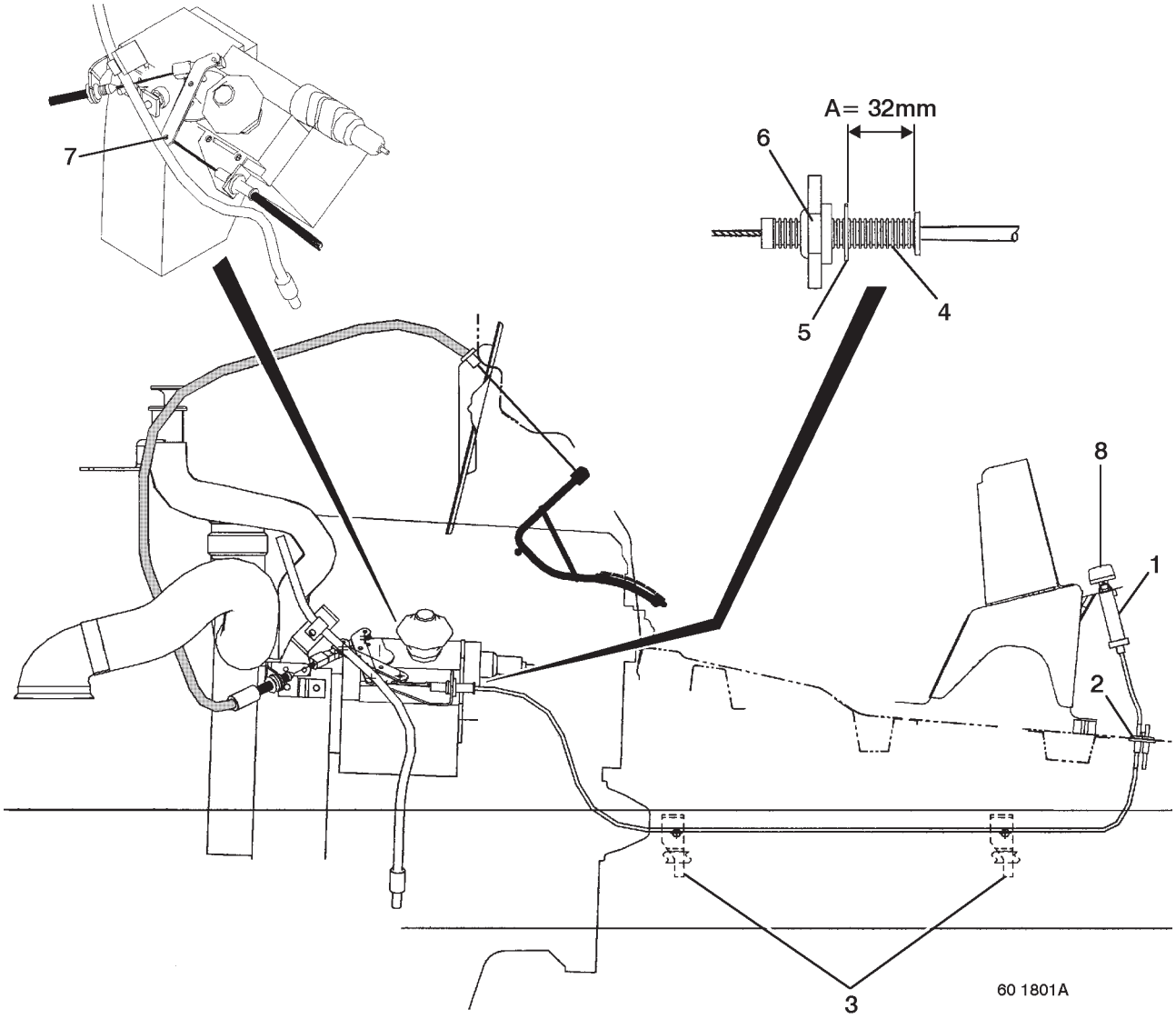
## 1.3 Fast idling control

Fast idling is controlled :
- by cable on vehicle equipped with mechanical injection pump,
- by electrical switch on vehicle equipped with “COMMON RAIL” electronic injection system.

Use: see driving and servicing handbook.

**Vehicle equipped with mechanical injection pump**

Installation of fast idling control cable :
Cable pull body (**1**) clipped to gear change lever bracket (LH port).
Sheath grommet (**2**) to be fitted in cab floor drilling.
Sheath fastened by two clips (**3**) holding the pipes to the sidemember.
Adjusting end (**4**) to be positioned (dimension A)in relation to the pin (**5**) in the rubber ring (**6**).
Cable end (**7**) to be installed on the injection pump control lever.
Control knob (**8**) to be clipped to the pull-knob.




Procurement :
- control knob (**8**) ref. N° 50 00 449 765
- control cable unit : LH drive ref. N° 50 10 382 719
  RH drive ref. N° 50 10 382 720

**Vehicle equipped with “COMMON RAIL” electronic injection system**

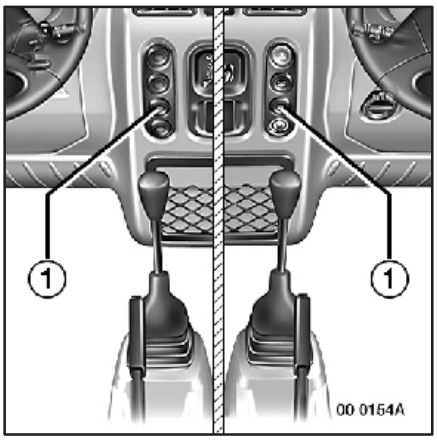
Install a switch (**1**) on the central console and connect it to the green connector on stand-by on the chassis wiring harness.

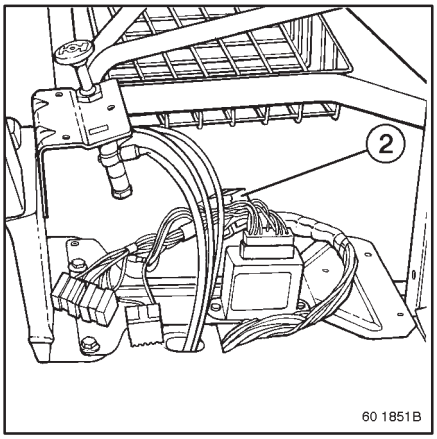
Connect a fast idling micro-relay to the connector (**2**) on stand-by on the chassis wiring harness.

Procurement:

- fast idling control switch ref. N° 77 00 377 205
- fast idling micro-relay ref. N° 77 00 414 484

The fast idling engine rotating speed is originally set at 1200 rpm.
It can be altered using the RENAULT TRUCKS diagnostics tool “DIAGNOSTICA”.
For this operation, contact the RENAULT TRUCKS network.




**Addition of a fast idling control switch to the chassis**

The fast idling control information sent to the injection ECU is an electrical pulse delivered by the switch. Since this switch is specific, it is compulsory, in the event of addition of an extra fast idling control switch, to use an identical switch.

It must be placed in a box protecting it against the weather and humidity.

The connection for the extra switch must be the same as for that of the in-cab switch.

If the vehicle is not provided with an in-cab switch: make an additional wiring harness to be connected directly to the vehicle wiring harness connector.

Connect a fast idling micro-relay to the connector (**2**) on stand-by on the chassis wiring harness.

If the vehicle is equipped with an in-cab switch: make an additional wiring harness to be connected in parallel to the switch located in the cab.

# 2. “RENAULT MASCOTT” ABS BOX

## 2.1 Description

The “ABS” box with RENAULT TRUCKS ref. N° 50 10 457 525 supersedes the former RENAULT TRUCKS box N° 50 10 344 162. This new “ABS” box features the retarder relay inhibition function.

## 2.2 Operation of the ABS box

This new “ABS” box self-configures when it is powered up for the first time.
If the retarder cut-off relay is not connected up when the box is powered up for the first time, the retarder relay inhibition function is inoperative.

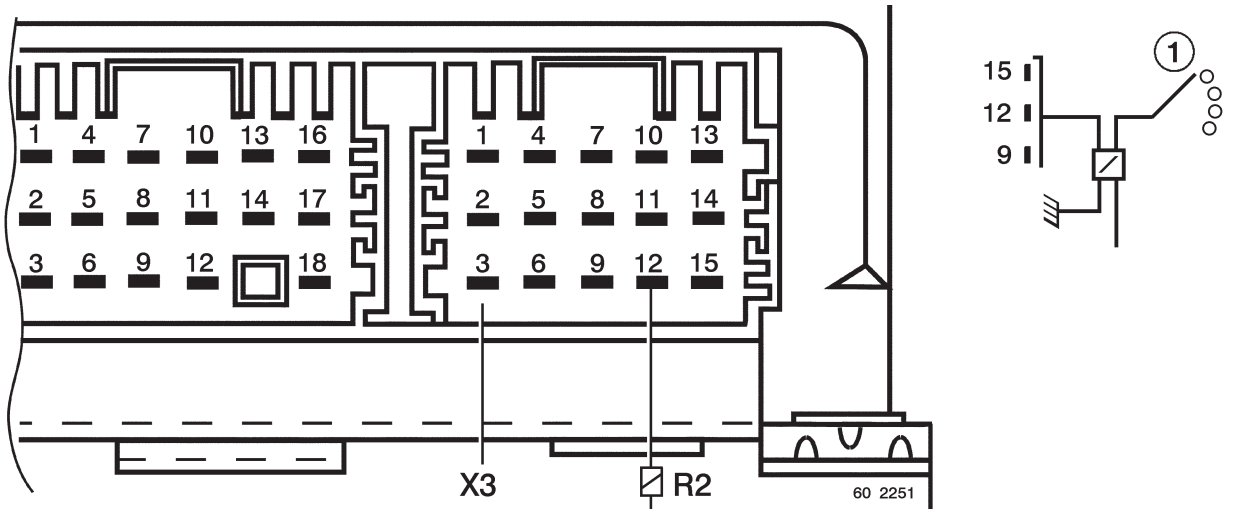
## 2.3 Instructions to follow

Before working on the “ABS” function of a vehicle from the “RENAULT MASCOTT” series, check the reference number of the “ABS” box:

- RENAULT TRUCKS 50 10 344 162: vehicle **without** retarder relay inhibition function.
- RENAULT TRUCKS 50 10 457 525: vehicle **with** retarder relay inhibition function.

### 2.3.1 Work on the ABS box (RENAULT TRUCKS 50 10 457 525)

Comply with the following procedure:
Check the connection of the retarder cut-off relay (**R2**) (connector **X3** - pin 12) before powering up the box.




***IMPORTANT***
*It is essential to configure or reconfigure the “ABS” with the RENAULT TRUCKS diagnostics tool “DIAGNOSTICA” to activate the retarder inhibition function.*
*For this operation, contact the RENAULT TRUCKS network.*

Any “ABS” vehicle with retarder not featuring the retarder inhibition function in the “ABS” phase is not compliant with the regulations and is dangerous.

Check the piloting of the retarder relay in the “ABS” phase. This operation is compulsory before the vehicle takes the road (traceability of this check is even advised).

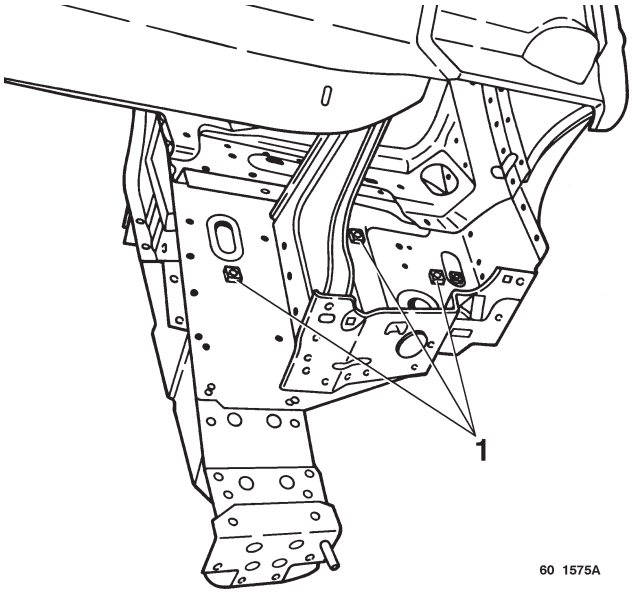
If a “RENAULT MASCOTT” vehicle is fitted with retarder equipment, and the vehicle is provided with an “ABS” box with RENAULT TRUCKS reference N° 50 10 344 162, it is absolutely essential to replace it with an RENAULT TRUCKS box with reference N° 50 10 457 525 and to assemble the retarder cut-off relay.
Then apply the rules described earlier.

# 3. ELECTRICS

## 3.1 Earths

### 3.1.1 Cab earths

Cab earths pre-arrangement: welded nuts (**1**) to be tapped on sidemember and on wheelarch in the engine compartment.




**Fastening of earth terminal lug or braid to cab**

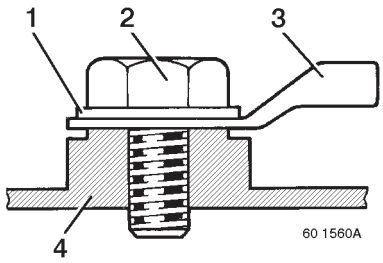
The earth terminal lug can be connected:
- to the main cab earth (RH wheelarch in the engine compartment),
- to the pre-arrangements (wheelarch in the engine compartment).

**Fastening of earth terminal lug to pre-arrangement**

- Tap the bore to diameter 8 x 1.25 mm.
- Scrape the paint on the support surface.
- Provide protection against corrosion using a zinc aerosol spray.

1 - Plain stainless steel washer Ø 8 mm
2 - Stainless steel bolt M8
3 - Flat earth terminal lug or braid
4 - Pre-arrangement (welded nut) on vehicle

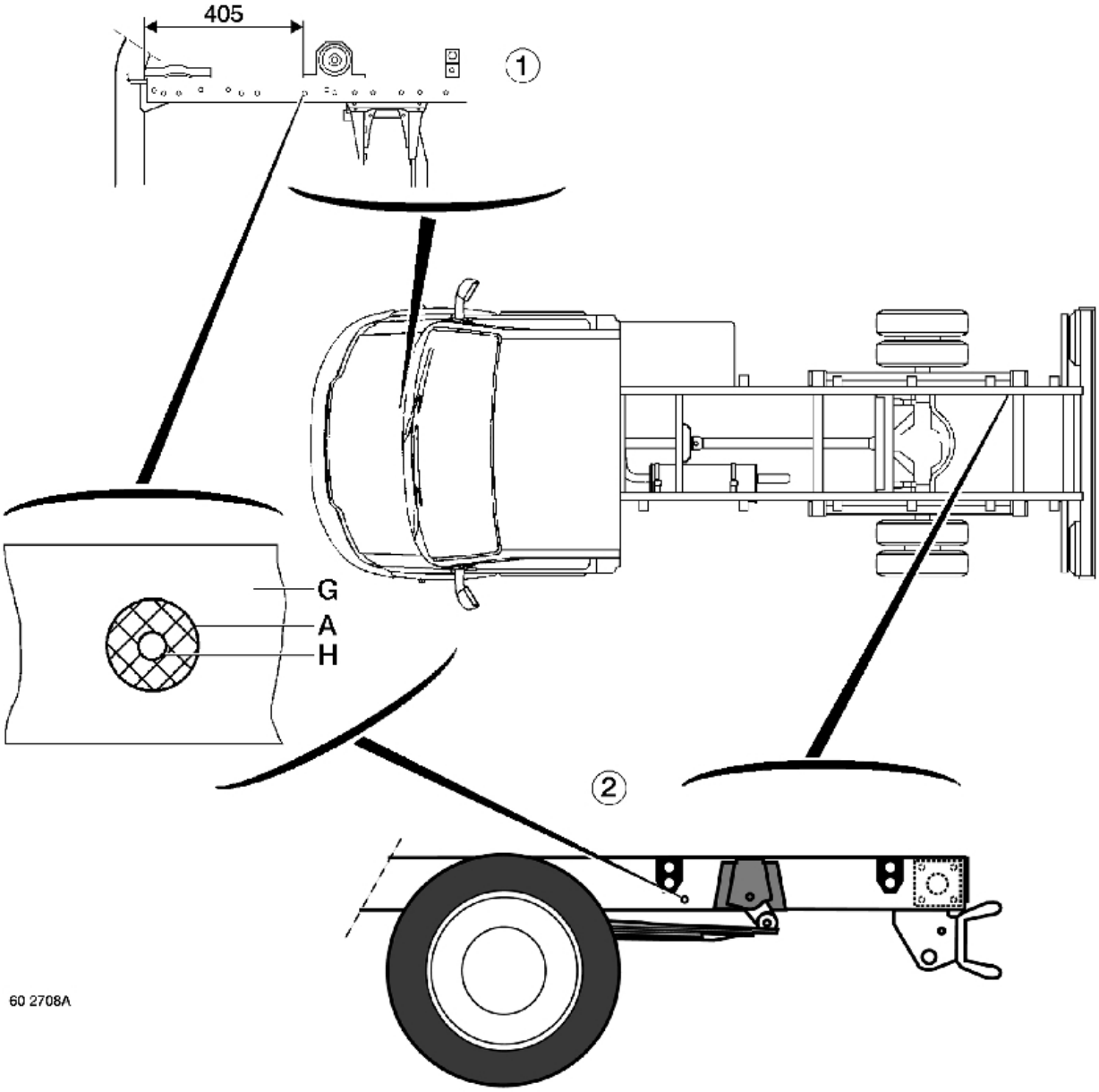
Nut (**2**) tightening torque: 9 ± 1 Nm




Ensure that it is protected against corrosion by using a zinc based aerosol spray (available from the Spare Parts Department part N° 77 01 406 425)

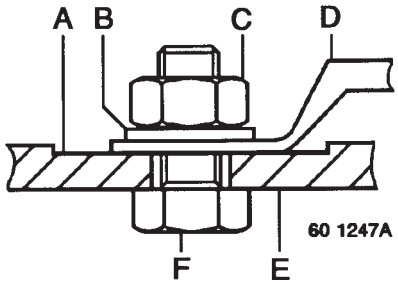
## 3.1.2 Chassis earths

1 - Battery earth on sidemember (side opposite steering wheel)
2 - Rear earth on RH sidemember leaf spring




**Assembly to electrical earth points dia. 11 mm**

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 H10 x 150
G - Painted sidemember
H - Electrical earths fixing hole dia. 11 mm




Tightening torque: 45 Nm ± 20%.

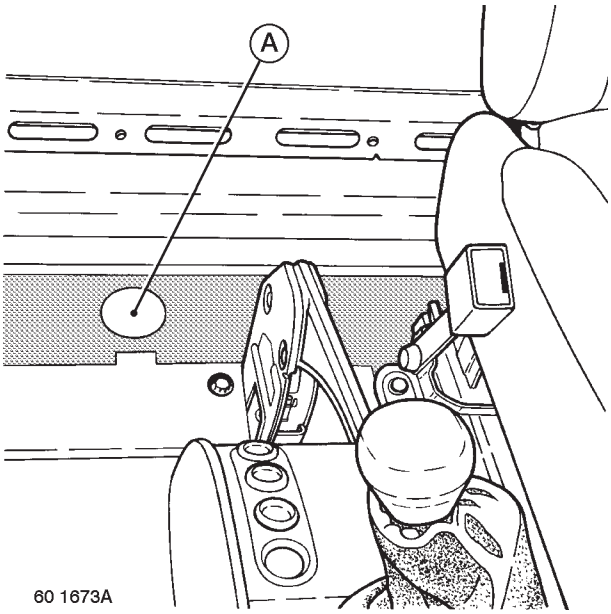
## 3.2 Passage of wiring harnesses through cab

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.

### 3.2.1 Passage through rear of cab (short cab only)

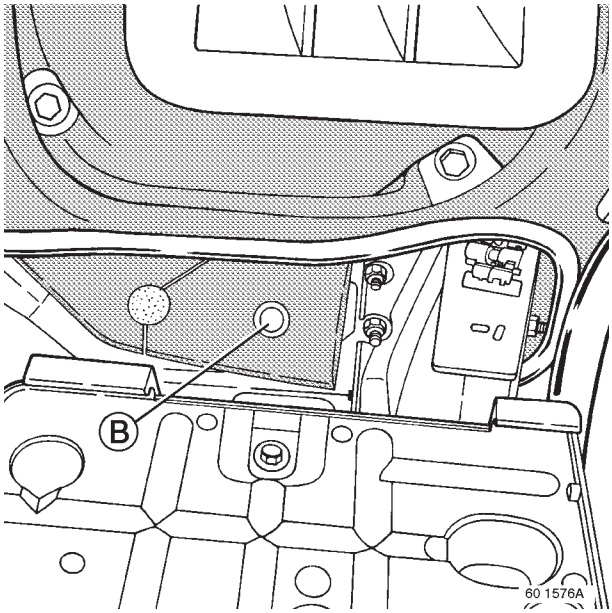
In a circle made in the floor soundproofing screen, an impression (**A**) centred on the side and 80 mm away from the rear end indicates the point of drilling.

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 tight seal with a grommet and a gasket.




### 3.2.2 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:
Remove the battery, if necessary, and disengage the floor carpet in the cab.
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 tight seal with a grommet and a gasket.

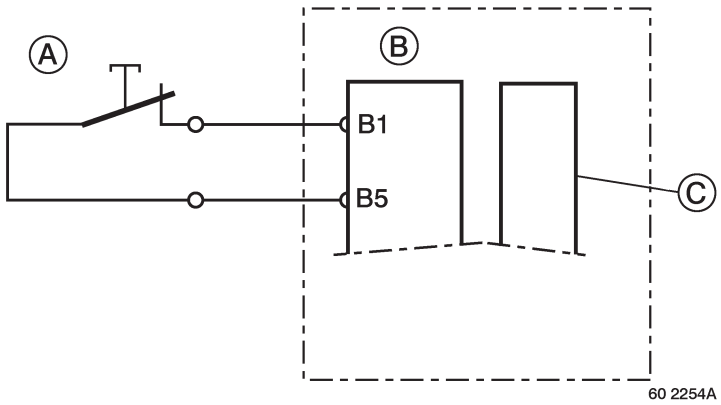


## 3.3 Reversing buzzer electrical diagram

A - Gear lever bracket switch
B - Intermediate engine fuses / relays box (BIM)
C - Chassis wiring

At B1, make a double crimping.
At B5, fit a terminal lug.

These wires have a section of 1 $mm^2$.



# 4. CHASSIS

## 4.1 Steel classes for sidemembers

Sidemembers cascade down into one class of steel (chapter A-2.1.4):
- class C for all cases.

**Steel classes table**

| Vehicle range<br>EXTRA (E = wheelbase) | Sidemember section | Steel class | | | |
|---|---|---|---|---|---|
| | | C | D | E | F |
| Van GVW ≤ 5 tonnes | 152 x 56 x 4 | X | | | |
| Van GVW = 5.5 tonnes | 152 x 56 x 5 | X | | | |
| Chassis cab GVW ≤ 5 tonnes (E < 4630) | 152 x 56 x 4 | X | | | |
| Chassis cab (E = 4630) | 152 x 56 x 5 | X | | | |
| Chassis cab GVW > 5 tonnes | 152 x 56 x 5 | X | | | |

GVW: Gross vehicle weight (plated)

## 4.2 Reinforcement, extension, shortening 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.

### 4.2.1 Modification to the chassis wiring harness length

It is advised to not modify the vehicle wiring harnesses. The wiring harnesses feature coils for this purpose to enable the length to be increased by about 20 centimetres. However, if for some essential reason the length of the wiring harness must be increased, make an electrical extension fitted with sealed connectors at both ends.

The modified wiring harnesses must be correctly fastened and follow the original routing for the vehicle.
Soldering on wiring harnesses is forbidden.
The added wiring harnesses and their connectors must be completely watertight. If necessary, make holes and low points for the evacuation of any water that might ingress into the wiring harness.

**Procurement:**

- connector ref. N° 77 03 197 407
- snap-on terminal lugs ref. N° 50 00 812 492
- 1 connector ref. N° 77 03 197 816
- snap-on terminal lugs ref. N° 50 00 812 493.

### 4.2.2 Modification to brake lines

Welding or add-on unions to brake pipes are forbidden. In the event of brake line modification, replace the original pipe by a pipe build in one single piece and presenting the same characteristics (inside diameter, steel grade, type of union, fixing point). The execution of such conversions is the sole responsibility of the equipment manufacturer.

## 4.2.3 Modification to the rear overhang

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 286 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”.

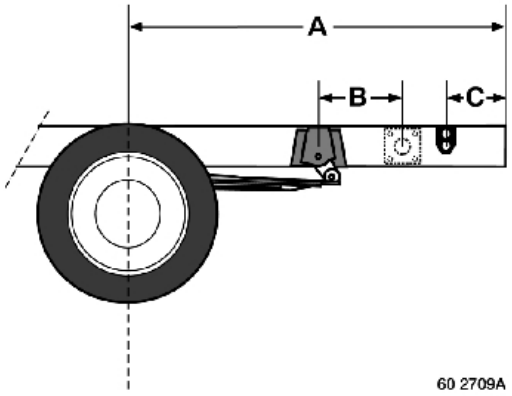
**Intermediate cross-member**

If, after extension:

**2050 < A < 2550 mm:**

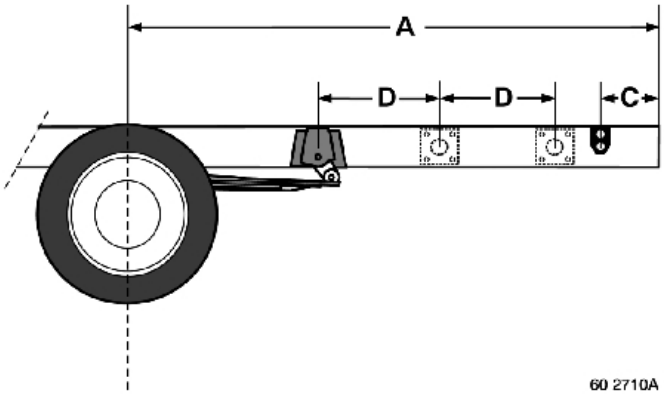
The chassis must be fitted with a cross-member to the rear of the rear suspension spring hanger cross-member.

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



**A > 2550 mm:**

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




**Note:**

Chassis:
- with wheelbase 4130 mm and rear overhang 1780 mm
- with wheelbase 3630 mm and rear overhang 1200 and 1380 mm

are pre-arranged for a rear overhang reduction to 845 mm.

The sidemembers are punched for repositioning of the chassis components without modification (lamp brackets, run-under guard, body brackets...).

The distance (**C**) between the last body bracket and the rear extremity of the sidemember must be less than 225 mm. If necessary, the towing cross-member is to be installed in addition to the intermediate cross-members (see chapter “Rear cross-member and towing cross-member”).

**Procurement:**

- 1 or 2 cross-members ref. N° 50 10 382 622
- 8 collar bolts HM10 x 125 x 30 - class 10.9 per cross-member
- 8 DRH (flanged) 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.

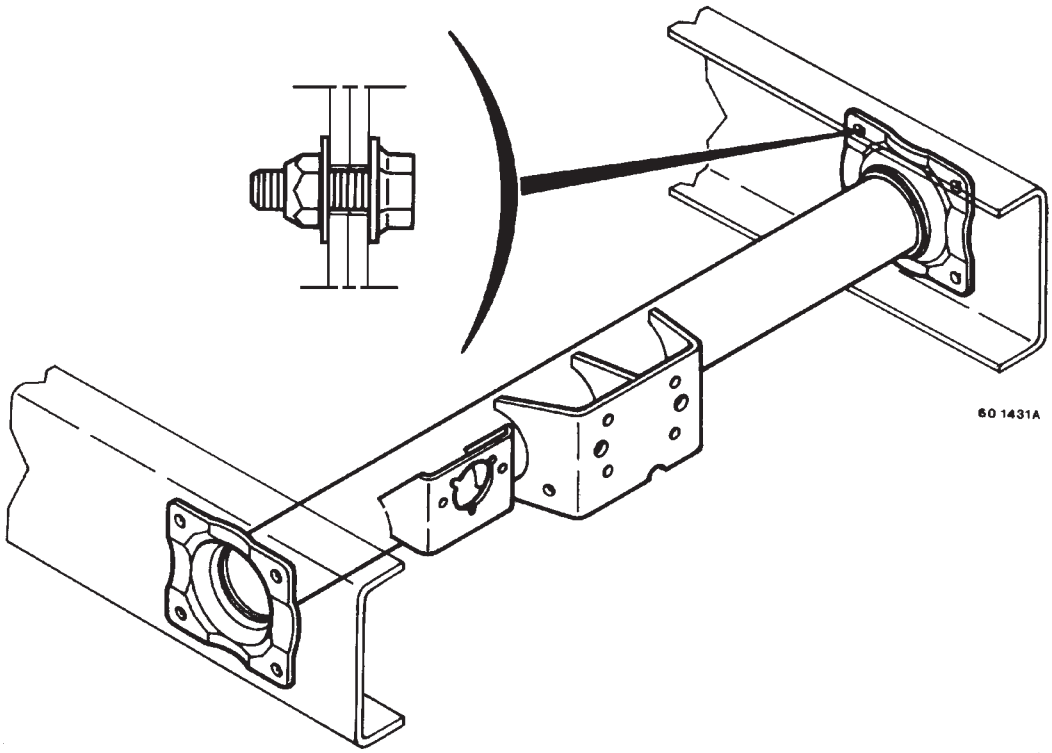
## 4.3 Rear cross-member and towing cross-member

### 4.3.1 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.

### 4.3.2 Towing cross-member

Optional for vehicles supplied without towing hook.
Maximum towable load: 3500 kg.
In the event of installation of a trailer signalling device, replace the original flasher unit ref. N° 77 00 377 037 by a flasher unit ref. N° 77 00 377 199.




### 4.3.3 Procurement

A - For all vehicles except cases quoted in **(B)**:
- 1 towing cross-member ref. N° 50 10 352 335 or intermediate cross-member ref. N° 50 10 382 622
- 8 collar bolts HM10 x 125 x 30 - class 10.9
- 8 DRH (flanged) nuts M10 x 125 - class 10
- 16 plain washers 10 x 22 x 3 to be placed under the nuts.

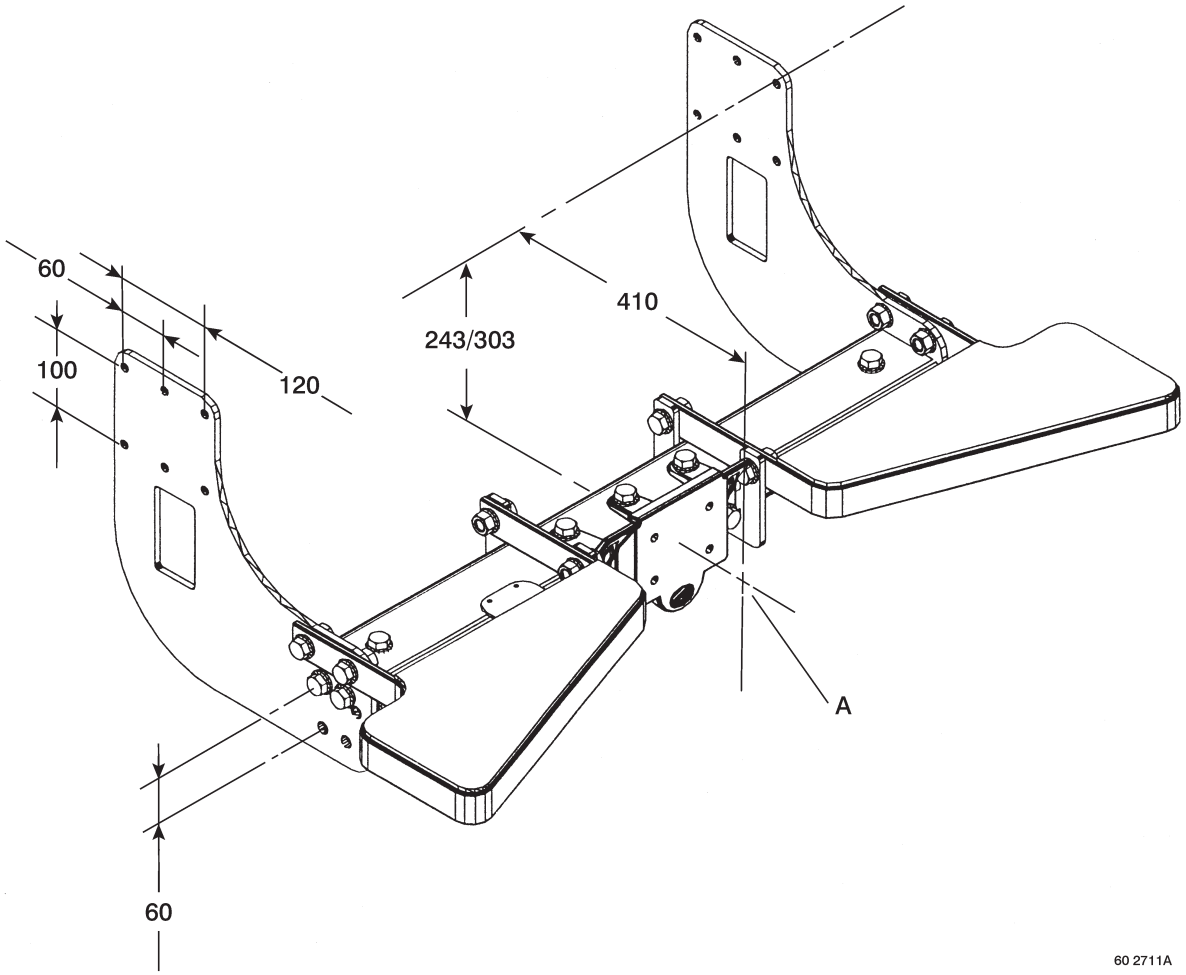
- Towing ball-hook ref. N° 50 10 236 734
- 1 trailer socket wiring harness ref. N° 77 00 377 122
- Flasher unit ref. N° 77 00 377 199.

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.

### 4.3.4 Towing cross-member on van

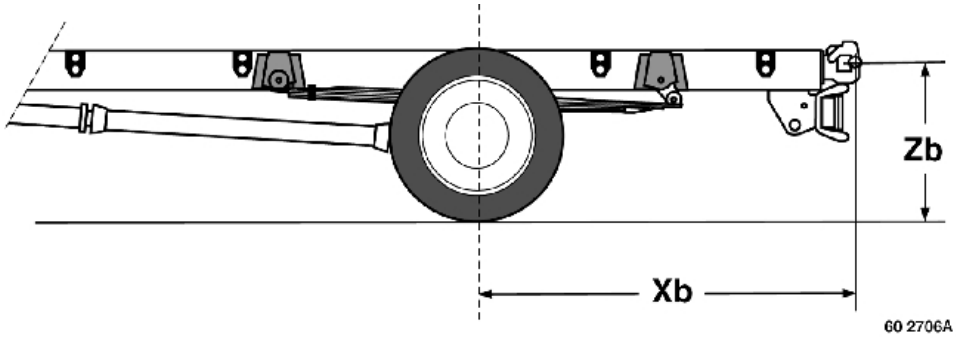
A drawing cross-member (ground clearance 350 to 420 mm) is specific for van vehicles with 3.5 tonnes capacity, towing up to 3 tonnes (available from the Spare Parts department).

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




A – Towing hook ball centre-line.

## 4.4 Hitching positions




| | | | | Zb ± 25 | |
|---|---|---|---|---|---|
| **GVW** | **Wheelbase** | **Overhang** | **Xb** | **max.** | **min.** |
| 3.5 tonnes dropped suspension | 3130 | 1080 | 1220 | 655 | 565 |
| | 3630 | 830 | 970 | 649 | 568 |
| | 3630 | 1380 | 1520 | 657 | 569 |
| | 4130 | 1780 | 1920 | 663 | 575 |
| | 4630 | 1340 | 1480 | 655 | 579 |
| 3.5 tonnes normal suspension | 3130 | 1080 | 1220 | 773 | 672 |
| | 3630 | 830 | 970 | 762 | 667 |
| | 3630 | 1380 | 1520 | 777 | 677 |
| | 4130 | 1780 | 1920 | 787 | 685 |
| | 4630 | 1340 | 1480 | 770 | 679 |
| 3.5 tonnes downrated | 3130 | 1080 | 1220 | 767 | 696 |
| | 3630 | 830 | 939 | 759 | 690 |
| | 3630 | 1200 | 1340 | 767 | 697 |
| | 4130 | 1780 | 1920 | 781 | 709 |
| | 4630 | 1340 | 1480 | 767 | 700 |
| 5.0 tonnes | 3130 | 1080 | 1220 | 781 | 617 |
| | 3630 | 830 | 970 | 769 | 617 |
| | 3630 | 1380 | 1520 | 785 | 620 |
| | 4130 | 1780 | 1920 | 795 | 626 |
| | 4630 | 1340 | 1480 | 778 | 629 |
| 5.5 tonnes | 3130 | 1080 | 1220 | 760 | 633 |
| | 3630 | 830 | 939 | 752 | 628 |
| | 3630 | 1200 | 1340 | 760 | 633 |
| | 4130 | 1780 | 1920 | 774 | 637 |
| | 4630 | 1340 | 1480 | 760 | 631 |
| 6.0 tonnes | 3130 | 1080 | 1220 | 767 | 623 |
| | 3630 | 830 | 939 | 759 | 620 |
| | 3630 | 1200 | 1340 | 767 | 622 |
| | 4130 | 1780 | 1920 | 781 | 625 |
| | 4630 | 1340 | 1480 | 767 | 621 |
| 6.5 tonnes | 3130 | 1080 | 1220 | 767 | 616 |
| | 3630 | 830 | 939 | 759 | 613 |
| | 3630 | 1200 | 1340 | 767 | 616 |
| | 4130 | 1780 | 1920 | 781 | 618 |
| | 4630 | 1340 | 1480 | 767 | 614 |

GVW : Gross Vehicle Weight

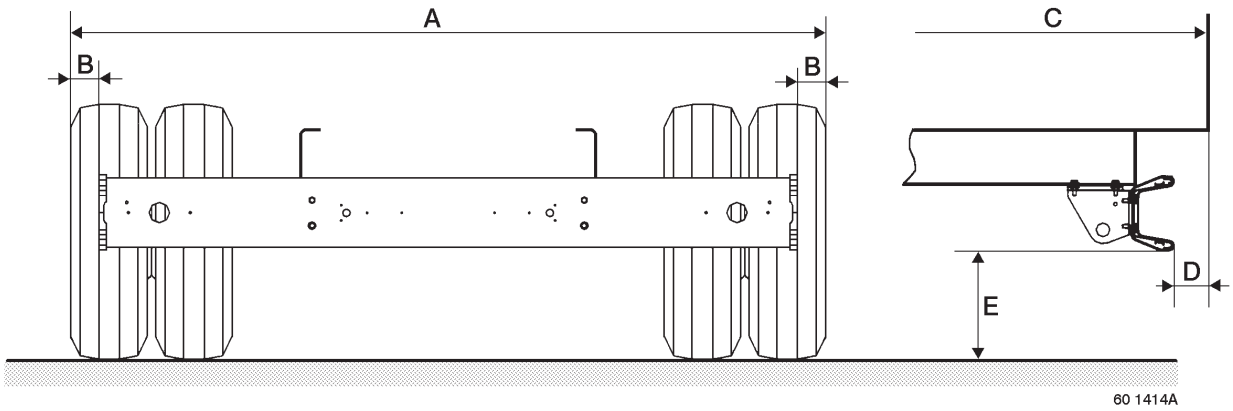
# 5 CHANGING THE POSITION OF EQUIPMENT ON CHASSIS

## 5.1 Changing the position of equipment

### 5.1.1 Rear run-under guard

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 body overall protrusion
(0 to 400 mm after deformation of run-under guard)
E - Maximum height, unladen, of run-under guard (550 mm max.)




### 5.1.2 Side impact beams

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

### 5.1.3 Lateral rearview mirrors

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

## 5.2 Assembly and protection of the exhaust system

There are three assemblies:
- supercharged engine without exhaust catalyzer (see page C29).
- naturally aspirated engine with exhaust catalyzer (see page C30).
- supercharged engine with exhaust catalyzer (see page C31).

## 5.2.1 Description of assembly

**Engine output exhaust line**

A: Exhaust line link kit with the engine.
Kit available from the Spare Parts department ref. N° 50 01 849 388.
Make-up (see following pages):
- 2 screws (**1**)
- 2 bushes (**2**)
- 1 exhaust ball-joint (**3**)
- 2 insulating washers (**4**)
- 2 compression springs (**5**)
- 2 support cups (**6**)
- 2 copper nuts **(7**).

In the naturally aspirated version, the exhaust line includes the catalytic converter (85 hp).
In the supercharged version, the exhaust line includes the catalytic converter (110 hp mechanical injection).

B: Exhaust line link with the catalytic converter or the intermediate fixing tube on the gearbox cross-member
- U-bolt 70 mm (**8**) ref. N° 00 00 681 810
- fixing lug unit (**9**) ref. N° 50 10 435 40
- fixing lug (**11**) ref. N° 50 10 435 145
- tightening torque: 9 Nm

C: Flexible pipe
- J: maximum shear offset (J < 3 mm)
- $\alpha$: maximum angle of flexion ($\alpha$ < 3 degrees).

**Catalytic converter (according to equipment)**

The catalytic converter is to be positioned vertically (tolerance + 10 degrees).

D: Link with intermediate tube:
- clamp (**12**) ref. N° 50 10 435 025
- U-bolt (**13**) ref. N° 00 00 681 810
- tightening torque: 9 Nm.

**Intermediate tube**

E: Link with exhaust silencer:
- clamp (**14**) dia. 62 mm ref. N° 50 10 317 401
- tightening torque: 9 Nm.

**Exhaust silencer**

F: Attachment to chassis:
- 2 brackets (**15**) ref. N° 50 10 435 106
- 2 clamps (**16**) ref. N° 50 10 435 250
- 2 spring mountings (**17**) ref. N° 50 00 750 497
- clamp 67 mm (**18**) ref. N° 50 10 317 402

## 5.2.2 Assembly recommendations

- In the event of exchange of the fastening (**A**), replace it with the kit ref. N° 50 01 849 388.
- It is forbidden to modify the position and the fastening (**B**).
- Do not exert stress on the flexible pipe during assembly or handling. Assembly of the flexible pipe with prestress (twist, traction or shear) will lead to shortening of the exhaust line service life.
- Tighten the clamps (**13**) and (**14**) (see page C31) only after finally positioning the complete line (pre-tightened U-bolt (**8**)).
- Wiring harnesses, tubes, pipes, cables situated less than 200 mm away from the exhaust line are to be protected against any damage or risk of fire connected with the giving off of heat.
- Fasten the exhaust silencer securely. The original attachment is strongly advised.

**- Vehicle equipped with a catalytic converter:**

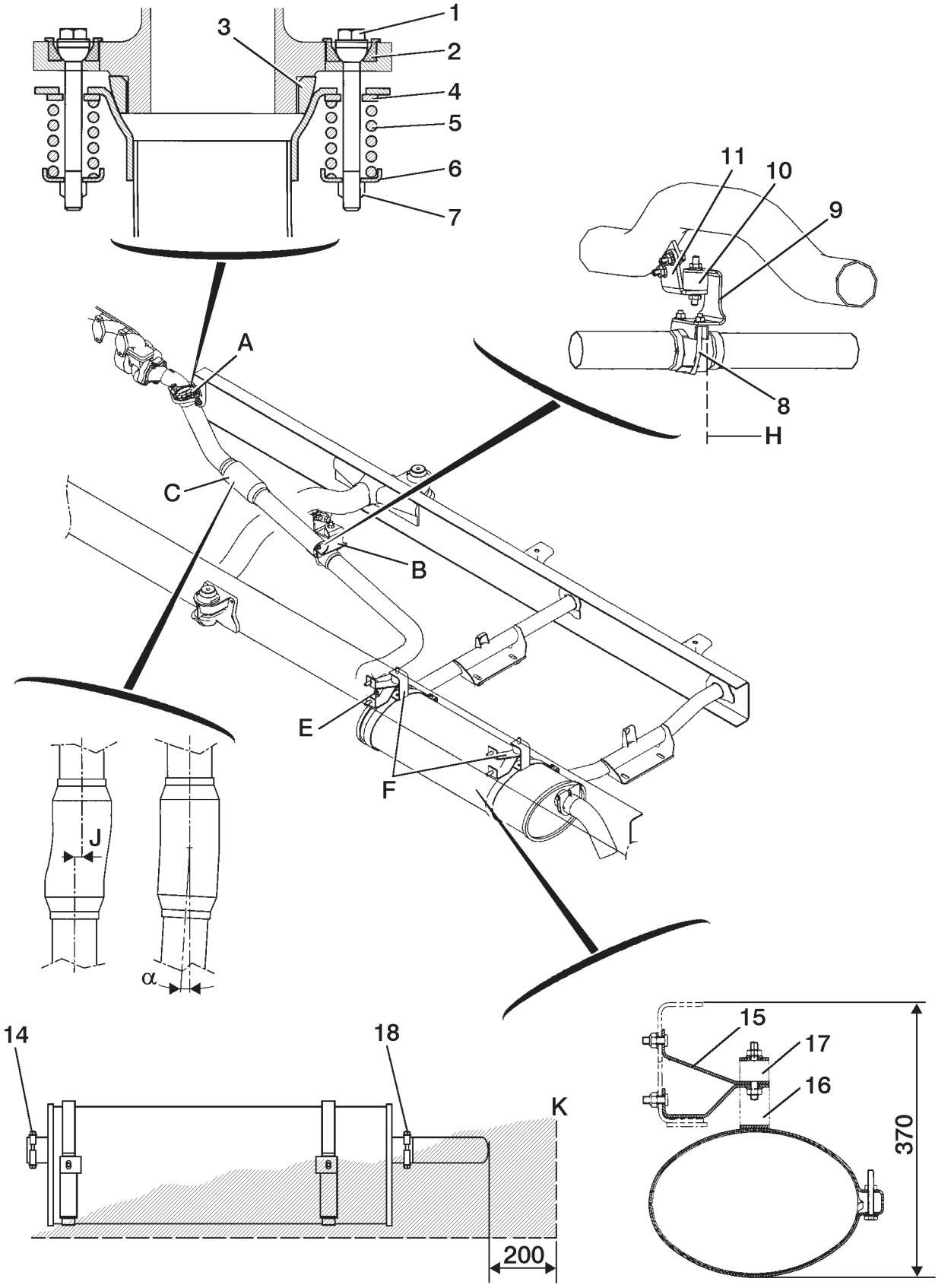
It is forbidden to modify the exhaust line as far as the rear extremity (**G**) of the catalytic converter.

**- Vehicle not equipped with a catalytic converter:**

It is forbidden to modify the exhaust line as far as the rear extremity (**H**) of the engine outlet exhaust line.

## 5.2.3 Protection against exhaust heat radiation

Extent of the zone to be protected against leakage and outflow of transported products (**K**):
- Width: at least equal to the width of the chassis.
- Length: from the rear cab brackets as far as the line (**K**).

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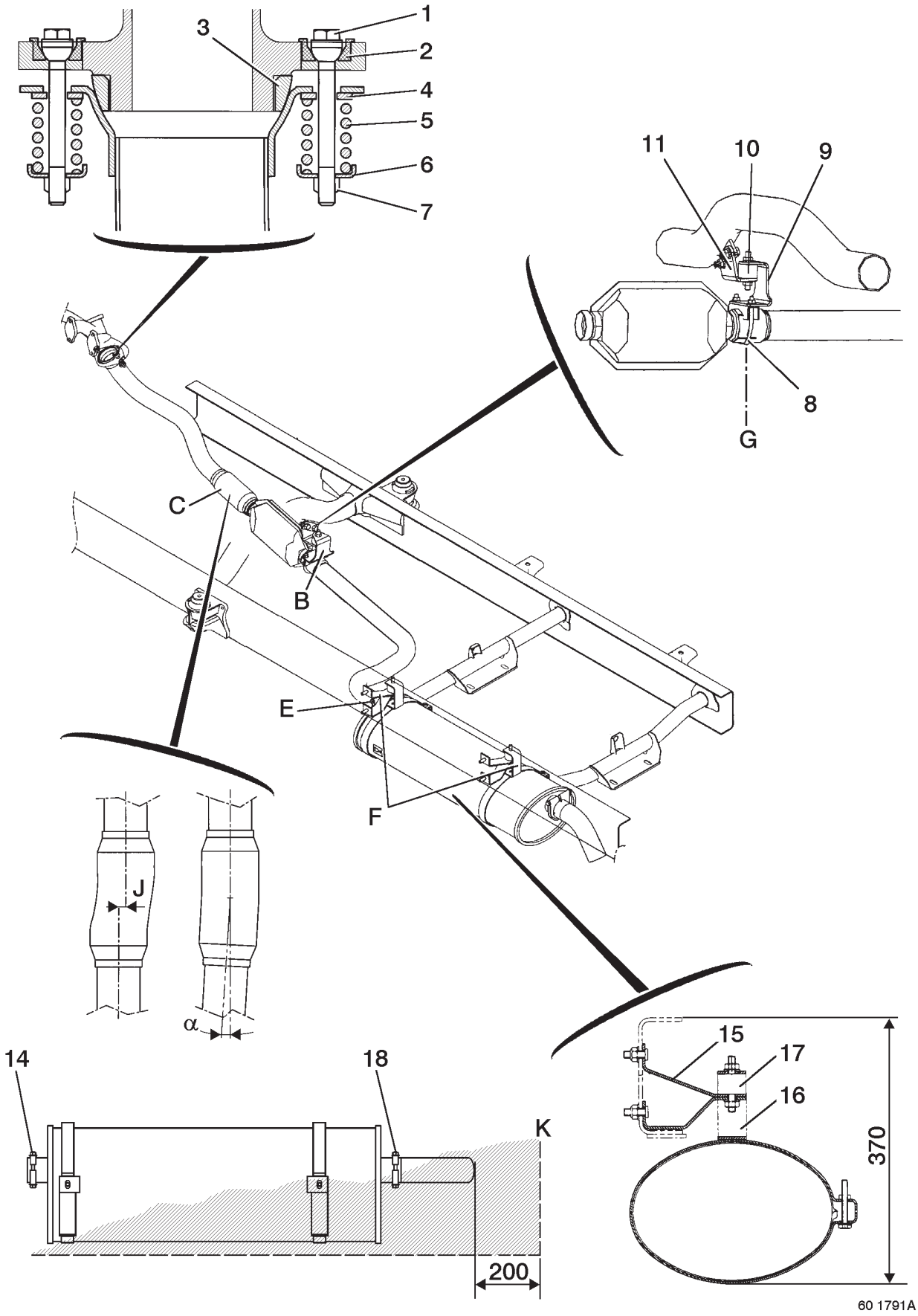
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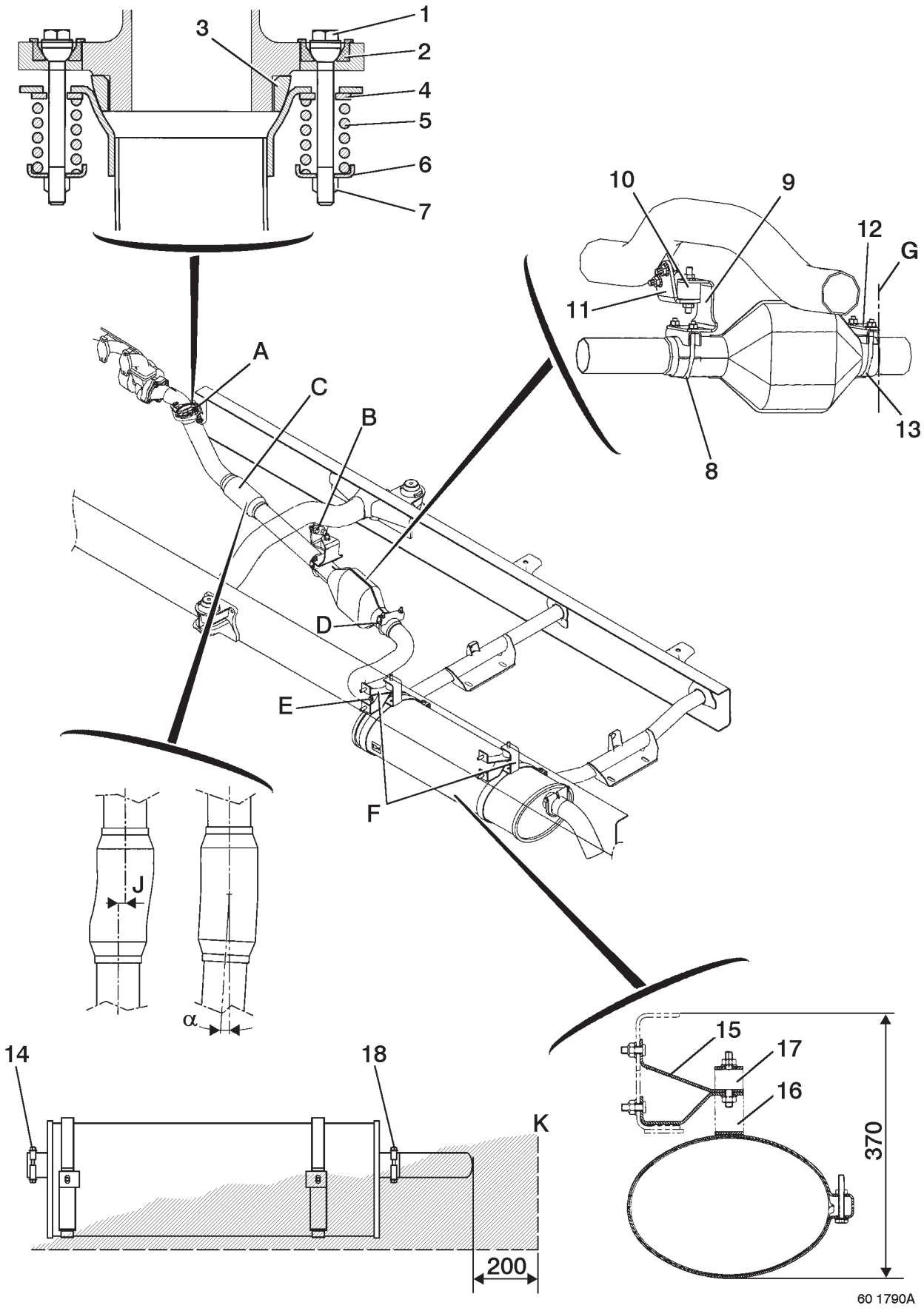
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# 6. ASSEMBLY OF EQUIPMENT TO CAB

## 6.1 Roof cut-out

### 6.1.1 Method

Remove the roof overhead lamp.

Remove the roof 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 ref. N° 77 01 406 425).

### 6.1.2 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:

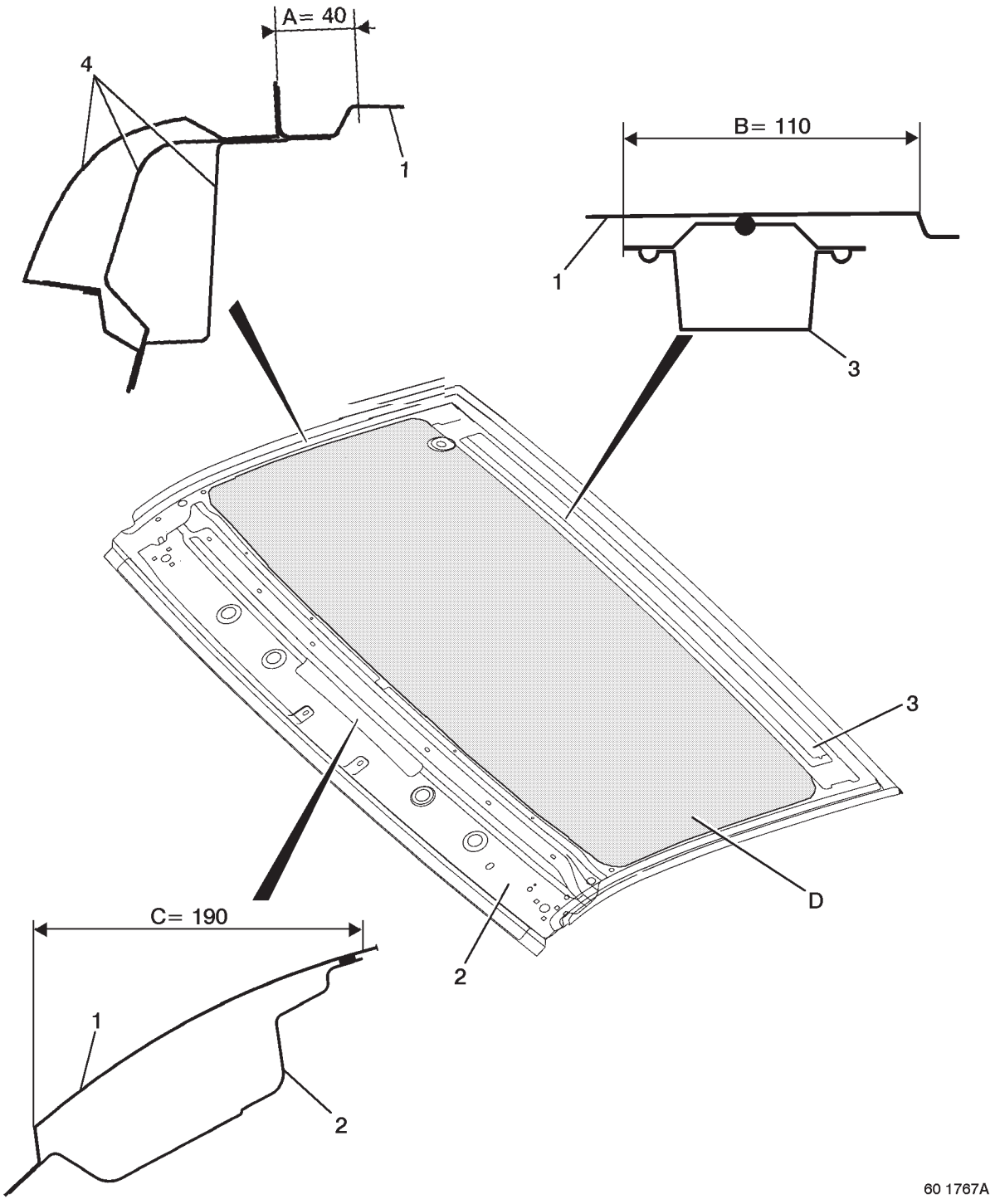
- the wiring harness routed at the front and on the sides of the roof,
- the rear cross-member of the roof at the level of the roof lamp bracket fastening.

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.


A= 40
4
1
B= 110
1
3
3
D
2
C= 190
1
2
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# 7. AIRBAG

*Depending on your vehicle's equipment*

***IMPORTANT***
*The fitting of a bull-bar, cattle guard or any other equipment 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.*

## 7.1 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).

## 7.2 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 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.*