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english edition

Guide for the Fitting of Bodywork for the MIDLUM Series

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IMPORTANT

Reading the "Guide for the Fitting of Bodywork for the MIDLUM series"

The "Guide for the Fitting of Bodywork for the MIDLUM series" ushers in a new type of presentation for bodywork fitting guides.

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

The data given in the "Guide for the Fitting of Bodywork" ref. (DT 6/354) has been included in the present document under the "General Features" section at the beginning.

You therefore no longer have to refer separately to the "Guide for the Fitting of Bodywork" ref. (DT 6/354) in order to use and understand this document.

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 - "MIDLUM special bodybuilding features": This deals in greater detail with presentation of the vehicle, attachment of the body, electrical pre-arrangements, trade vehicles and trade packs.

C - "Supplementary information on the MIDLUM Euro 3 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 MIDLUM 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 MIDLUM vehicle" sections, so as to ensure that you have obtained all the relevant details.

RENAULT V.I. S.A. au capital de 327 978 500 F.
Siège social : 99, route de Lyon - 69802 Saint-Priest

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CHAPTER -A-
GENERAL FEATURES

1. GENERAL FEATURES

1.1 Scope of liability

RENAULT V.I. 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 V.I. 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 V.I. (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 V.I. 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 V.I. 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 V.I. 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 V.I. Product Applications Department.

For further information or assembly agreement, contact:

TO OBTAIN ANY INFORMATION OR APPROVAL OF MOUNTING, PLEASE CONTACT:

For France:
SERVICE TECHNICO-COMMERCIAL
RENAULT V.I.
API. COM 00A 238
69806 ST PRIEST CEDEX
Tel.: 04 72 96 68 14
Telex: 300 265 UDCF +
Fax: 04 72 96 81 93

For the United Kingdom:
Product Applications Department
RENAULT V.I. UNITED KINGDOM LIMITED
Boscombe Road,
Dunstable
Bedfordshire LU5 4LX
Tel. (Switchboard): (+44) (0)1582 471 122
Fax (Marketing) (+44) (0)1582 479 146

1.2 Regulations

The bodybuilder must meet:
- the different European and/or destination country laws, regulations and standards governing driving and vehicle building,
- the stipulations of the highway code and its various amendments and appendices,
- the different laws, regulations and standards governing road traffic in force in the country of destination.

The scope of this compliance must cover:
- Lighting and signalling,
- Weight and dimensions,
- The field of vision and rear view,
- The regulation protection devices (e.g. side beams, 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, COSHH etc.),
- Sun-roofs,
- 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 bolts),
- 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 on the dashboard),
- 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 crossmembers.
- 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 V.I. expects from all those co-operating with it in the field of mounting bodywork and equipment supply to implement a Quality Assurance System.

RENAULT V.I. 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.

- Complete 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 V.I.

It is forbidden to weld, grind, cut up, drill or heat the sidemembers or crossmembers 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 V.I. 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 keys: 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 V.I. 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 aft of the cab, laid down by the manufacturer, and the maximum permitted loads per axle on a chassis cab without options.

Body entrance (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 V.I.
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 V.I. 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 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 V.I. 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 V.I. Specification No 4702 441 (protection of bodywork and equipment adapted to RENAULT V.I. 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 cleaner or using a high-pressure cleaner.
- Wipe down, then apply a primer.
- Let the product cure until mat (about 15 minutes at 20° C), then apply the corresponding polyurethane lacquer.

1.14.3 **Chassis frame and accessories** (sidemembers, crossmembers, 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 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 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 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 V.I.

Supplier	Commercial name	RENAULT V.I. Ref.	Supplier Ref.
BASF	PK 900	50 01 821 758	SV 20023F
ICI AUTOCOLOR	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 V.I.

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

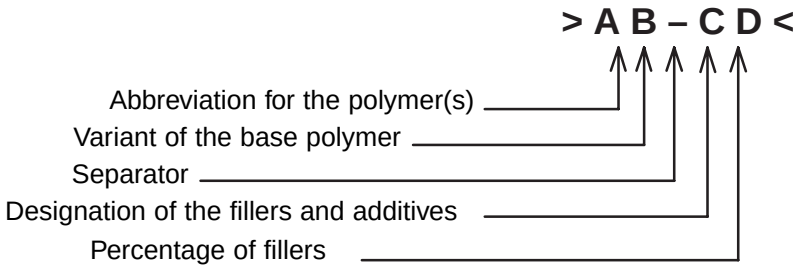
Finish paint

Two-component polyurethane paint and corresponding thinner.

1.14.5 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 V.I. 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 V.I.).
- 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 Product Applications Department of RENAULT V.I.
- A schematic diagram should be submitted for the approval of RENAULT V.I., 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 V.I. has been obtained).
- Follow the electrical protection recommendations of RENAULT V.I.; 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 mm2).
- 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 V.I. 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 V.I. 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 V.I. (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 V.I. 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.

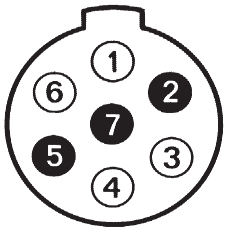
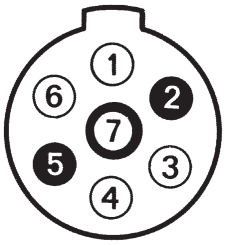
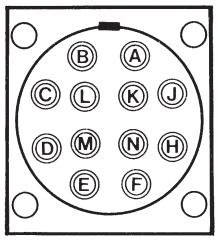
The flasher units are designed for a maximum rating which is marked on the unit.

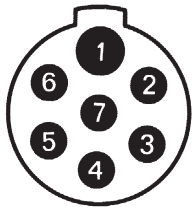
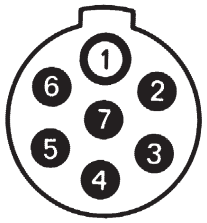
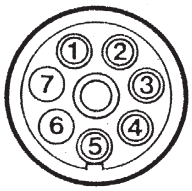
Do not exceed this power rating.

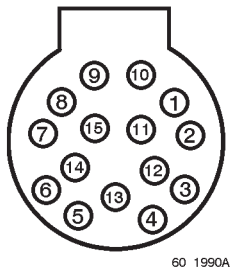
Connection

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

SUPPLY VOLTAGE	DESCRIPTION AND STANDARDS	SOCKET DIAGRAM (front view)
24 Volts	24 N type socket (Standard: - BNA.R43.406 dated January 1976 - ISO 1185). 1 - Earth. 2 - LH rear side and marker lamp and number plate illumination lamp. 3 - LH direction indicator lamps. 4 - Stop lamps. 5 - RH direction indicator lamps. 6 - rear side and marker lamps and number plate illumination lamp. 7 - Trailer braking lamp. Terminal 7 is scheduled in certain countries for supplying power to regulation trailer brakes. Under no circumstances must it be used as an earth terminal.	 600040
24 Volts	24 S type socket (Standard: - BNA.R43.409 dated April 1982 - ISO 3731). This is a supplementary socket which is assembled in addition to the 24 N socket. 1 - Earth. 2 - Not allocated. 3 - Reversing lamp. 4 - Power supply. 5 - Earthing monitor. 6 - Supplementary power supply. 7 - Rear fog lamp.	 600041
24 Volts	24 P (oil tanker) type socket (Standard: - BNA.R.10.120 dated June 1977) This is the socket for ADR (Transport of Hazardous Substances) vehicles which is assembled in addition to the 24 N socket. 1 - Earth. 2 - Valve lighting. 3 - Reversing lamp. 4 - Positive (+) power supply. 5 - Insulated earth. 6 - Not allocated. 7 - Rear fog lamp.	 600042
24 Volts	ABS specific type socket (Standard: - ISO 7638) 1 - Power (30A). 2 - Control power supply (2A). 3 - Control earth (2A). 4 - Power earth (30A). 5 - Information (2A). 6 - Free. 7 - Free.	 600563

SUPPLY VOLTAGE	DESCRIPTION AND STANDARDS	SOCKET DIAGRAM (front view)
24 Volts	15-pin trailer socket (Standard: - ADR 1999 IP54 and anti-unhooking - ISO 12098). 1 - LH direction indicator lamps 2 - RH direction indicator lamps 3 - Rear fog lamp 4 - Earth 5 - RH rear side/parking and marker and registration plate lamps 6 - LH rear side/parking and marker and registration plate lamps 7 - Stop lamps 8 - Reversing lamps 9 - 24V positive (+) power supply Since July 1999, the 15-way socket replaces 24N and 24P sockets. Channels 10, 11, 12, 13, 14, 15 are unaffected.	 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 V.I. 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 V.I. 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 V.I., 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 V.I. 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 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, part N° 50 20 034 156 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 V.I. 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 ratchet 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 V.I. 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, U-bolts 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 disk sander, 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.

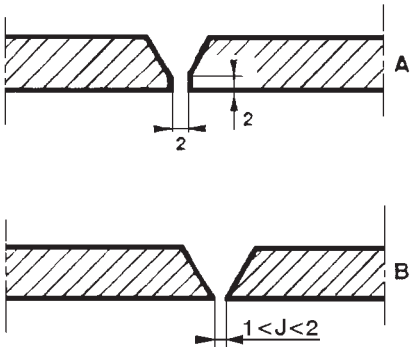
2.1.2 Preparation of parts for welding

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).

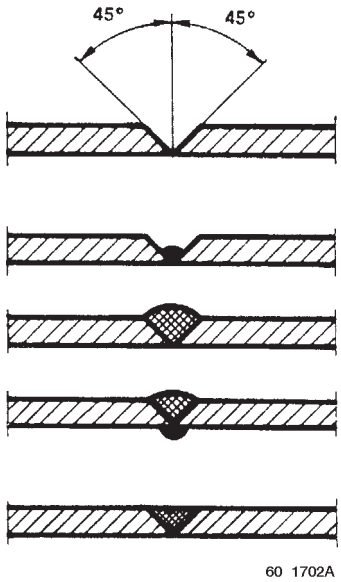
For conversions (extensions, reductions and reinforcement gussets), we recommend arc welding with electrode type B. When semi-automatic welding is use, the bodybuilder must be able to guarantee weld quality.

Preparation of specific edges on chassis frames
A - With electric arc welding
B - With weld under gas shield (MAG or MIG)



Method of welding to be specifically used on chassis frames

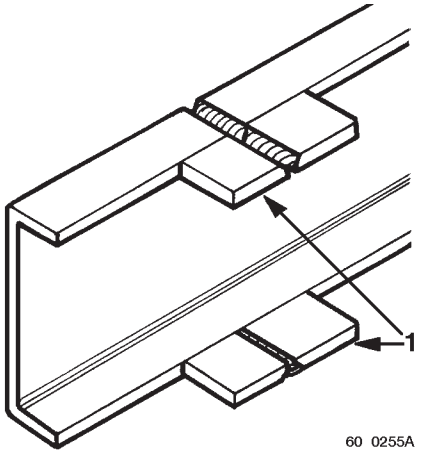
– Preparation of the edges at 45°
– Tack
– Position slave butts
– Weld on one single side
– Weld on second side
– Welds ground flush on both sides



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.

Relevant standards

AFNOR A 81.309 (12.1975)	ISO 2560	ASME (SFA 5.1) AWS (AS.1.69)	DIN 1913	BS 639
E 435/4 B 26 BH	E 435 B 26 (H)	E 7016	E 453/4 B 10	E 435 B 26 (H)
E 515/5 B 26 BH	E 515 B 26 (H)	E 7018	E 515/5 B 10	E 515/6 B 26 (H)

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 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 has replaced French Standard NF A 36.231. High yield strength sheet steel (dispersed carbon)

	RENAULT V.I. Specification 31.09-402			
	Class C	**Class D**	**Class E**	**Class F**
UTS in N/mm2 min.	450	500	540	610
YP at 0.2% in N/mm2 min.	355	445	490	560
E % min.	23	20	18	15
KCV at - 20o 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	Fe E560 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

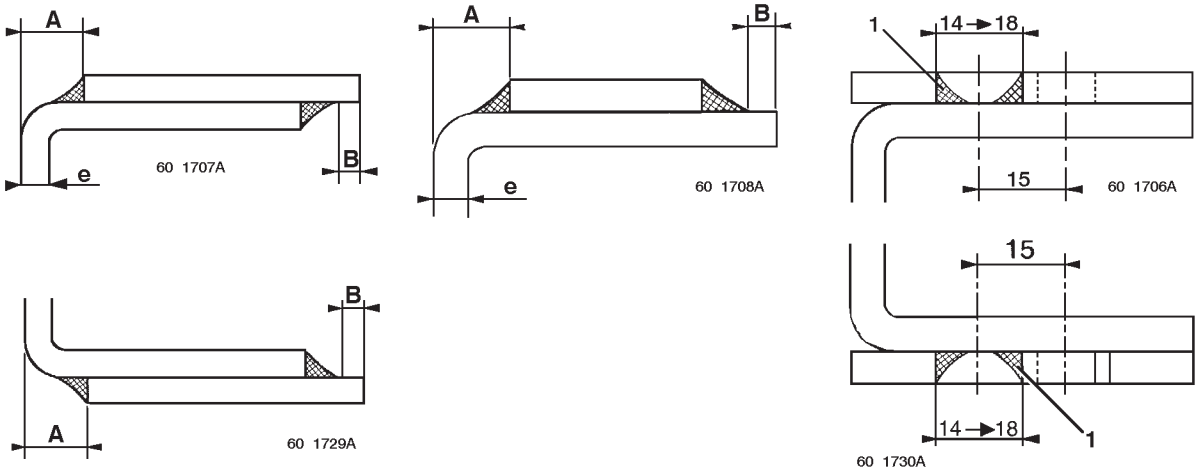
- For inner reinforcements and chassis flange stiffeners, the thickness should be the same as the thickness of the sidemember.

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

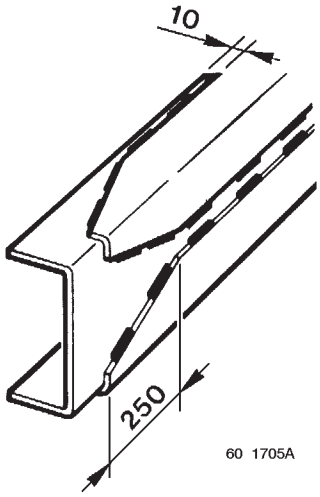
Upper and lower stiffeners using angle-irons :

60 1053

Method 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.



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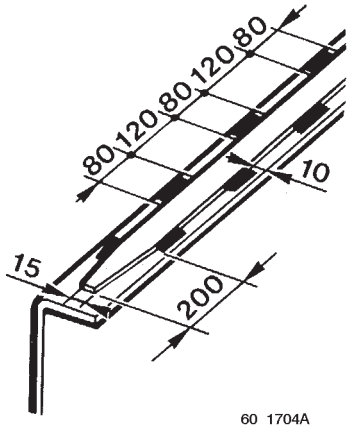

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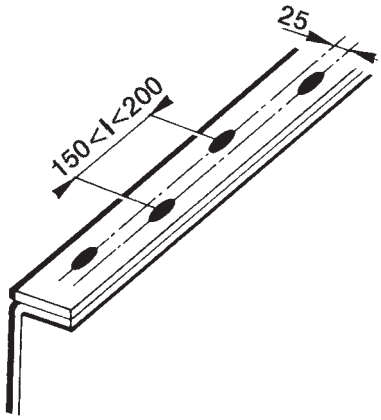

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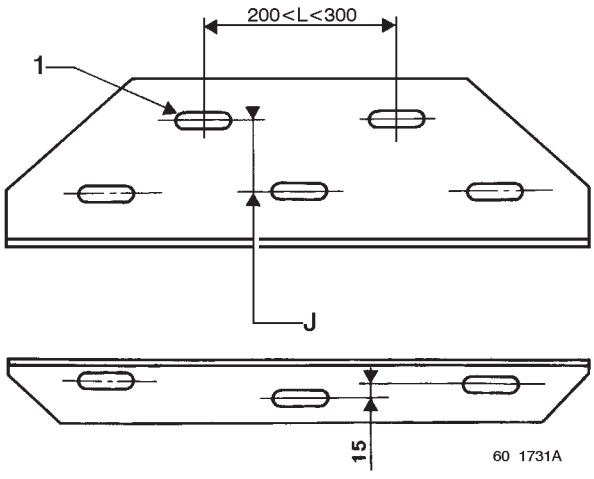
"PLUG" welds: as guidance, round holes diameter 14 to 18 mm or slotted (1) holes diameter 14 x 50 mm to 18 x 50 mm at a "pitch" of 200 mm min. to 300 mm. max., staggered, with good quality weld.

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



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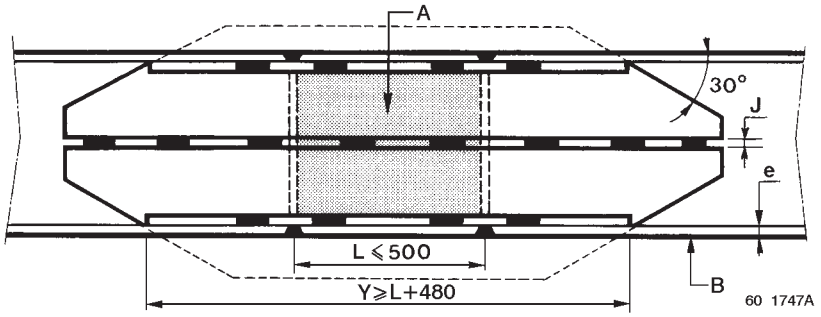
Extension, shortening of sidemembers in the wheelbase

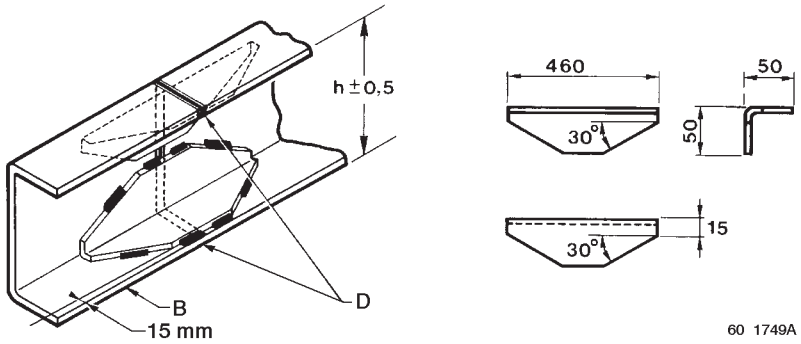
Extension of the sidemembers in the wheelbase

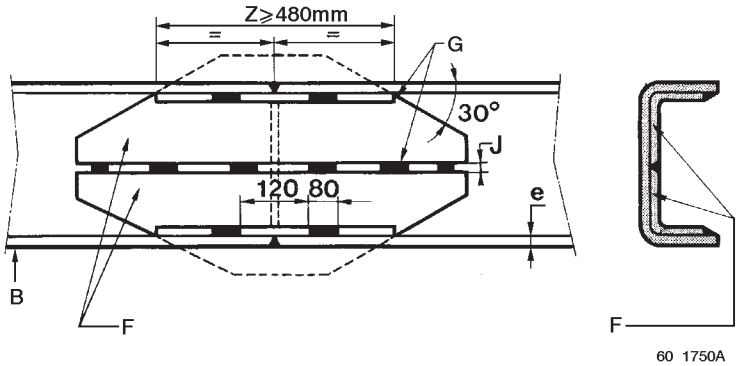
Key

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),
h – height of the sidemember,
J – weld penetration clearance (about 2 mm),
L – max. length of extension,
X – max. 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).

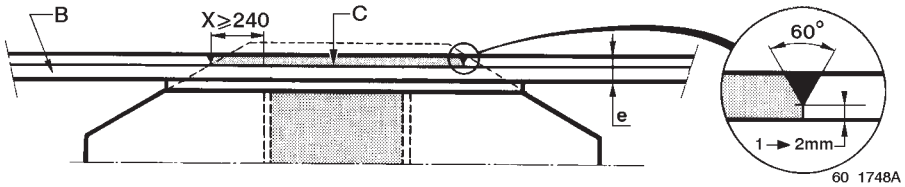
Sidemember without stiffener flat on the flange







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 V.I. (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 crossmembers

Crossmembers should be attached with nut and bolt hardware of the 10.9 SSS protected class as per standard 01714002 and distributed by RENAULT V.I.

Towing crossmembers

Please refer to the chapter on "Drawbar crossmembers" in the section entitled "SPECIFIC FEATURES OF THE MIDLUM VEHICLE".

Intermediate crossmembers

In the case of extension of the wheelbase or the rear overhang, it is essential to add crossmembers, so as not to weaken the rigidity of the frame.

Observe the following instructions:

- Between two crossmembers, 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 crossmember 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 crossmembers.
- 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 hooks (use U-bolts).

All bodies attached by clamps and brackets must mandatorily have 1 inertia stop to the aft 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 11, 13 or 15 mm diameter 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”.

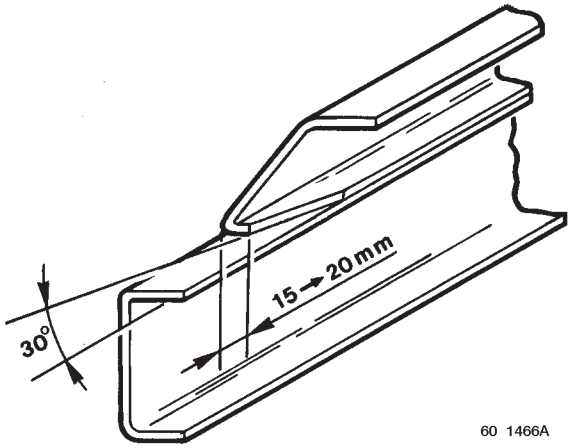
2.3.2 Protection against exhaust heat radiation

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 “MIDLUM 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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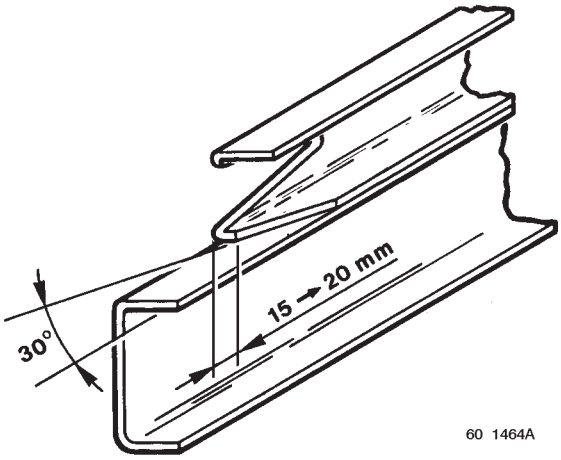

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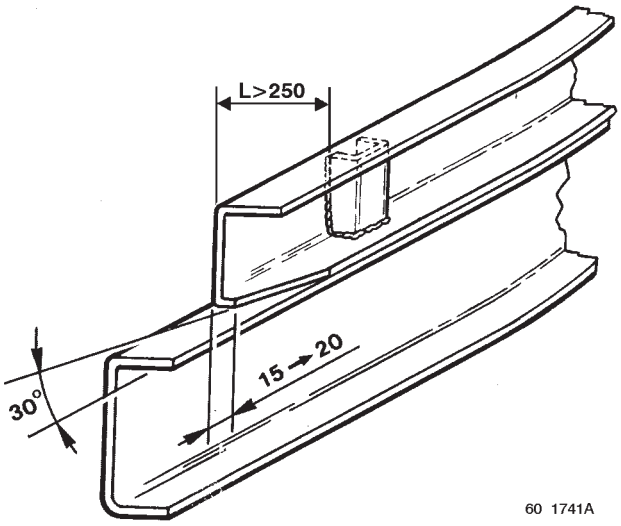

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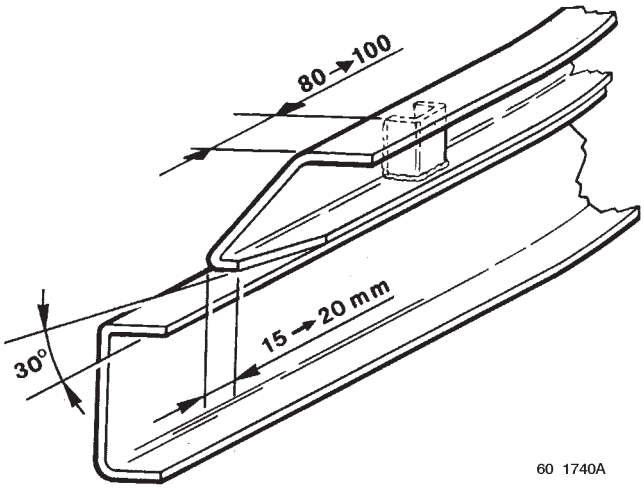

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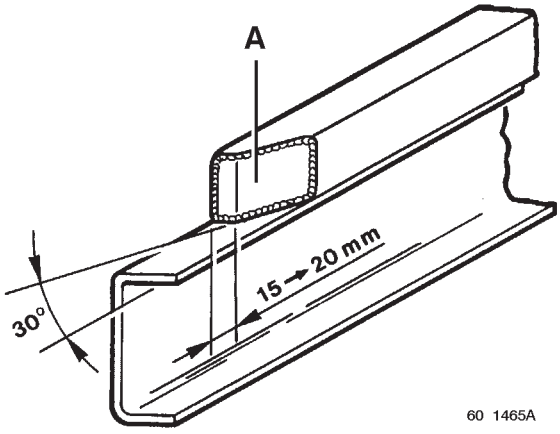
When the sub-frame is constructed of square or rectangular tube section, we also suggest the cut-out shown below.

A: Blank off with 1.5 mm thick sheet metal



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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 ± 003).

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

Description	Characteristics	Class of Steel	Part Nos.	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

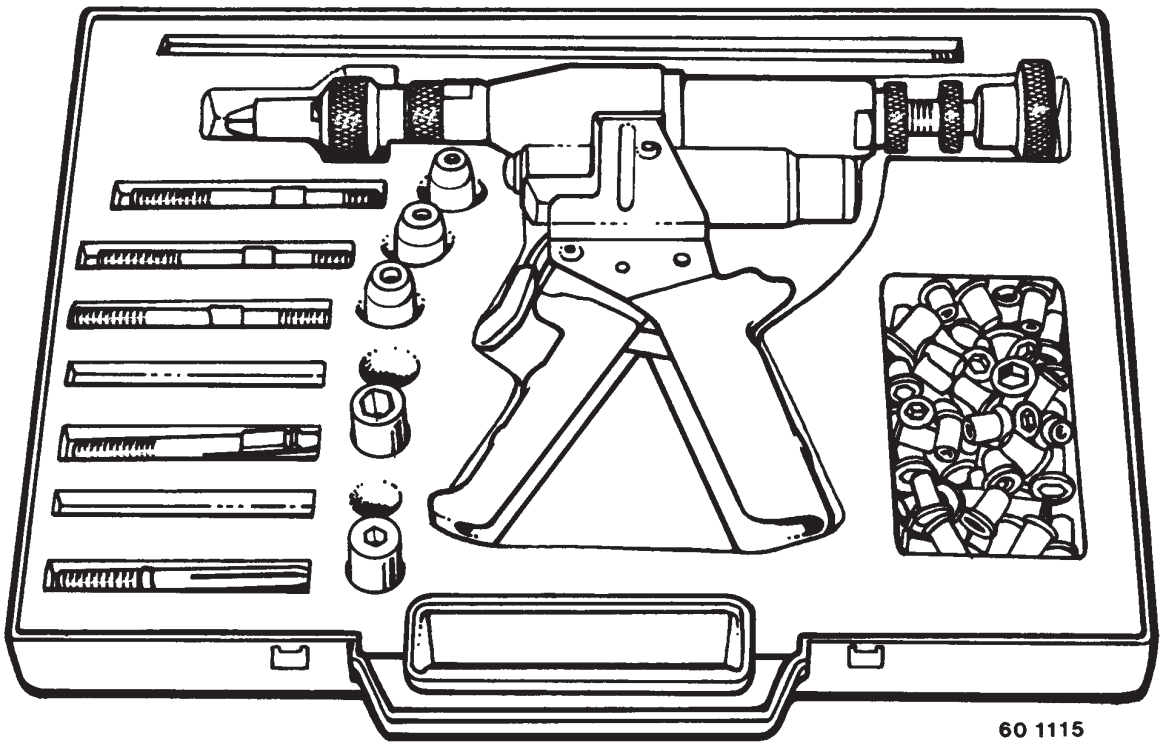
Description	Characteristics	Part Nos.
Cone washer	10 x 20 x 2.2	50 03 058 081
	10 x 24 x 2.8	50 03 058 071
	10 x 27 x 2.8	50 03 058 076
	12 x 30 x 3.2	50 03 058 075
	14 x 28 x 3	50 03 058 069
	16 x 32 x 3.4	50 03 058 034
	16 x 39 x 3.6	50 03 058 070
Flat washer	10 x 22 x 3	50 03 053 453
	10 x 27 x 3	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 03 053 014
Cone washer “Belleville” type	14.5 x 35 x 1.8	00 21 721 040

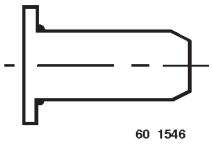
Description	Characteristics	Class of Steel	Part Nos.	Tightening torque
Nut	10 x 125	10	50 03 032 156	60 N.m
	12 x 125	10	50 03 032 157	110 N.m
	14 x 150	10	50 03 032 159	170 N.m
	16 x 150	10	50 03 032 236	220 N.m
Locknut DRH (flanged)	10 x 125	10	50 03 034 246	60 N.m
	12 x 125	10	50 03 034 248	110 N.m
	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.

Tooling and crimping nuts



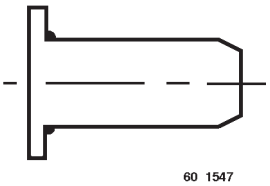


M6 crimp nut - hexagonal barrel

Part N°: 50 03 043 050

Method:
- Drill a 9.2 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 max. 10 Nm.
- Length of barrel projecting under bracket after crimping: 17 mm.



M8 crimp nut - hexagonal barrel

Part N°: 50 03 043 052

Method:
- Drill a 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 max. 24 Nm.
- Length of barrel projecting under bracket after crimping: 21 mm.

2.7 Rear run-under guard

RENAULT V.I. 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 V.I. vehicle for the fitting of bodywork and equipment requires technical approval to be obtained from the Product Applications Department of RENAULT V.I.

3. SPECIFIC EQUIPMENT FEATURES

3.1 Running the engine when vehicle stationary

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

3.2 Mounting of power take-offs and flanged pumps

RENAULT V.I. power take-offs (PTOs) and their adapter kits should be ordered from the RENAULT V.I. 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 V.I. 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

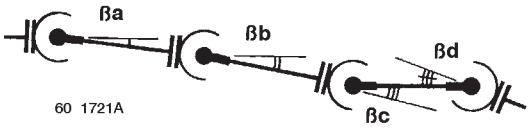
3.4.1 Propeller shaft alignment

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

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

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

$$\beta_E \leq 3°$$

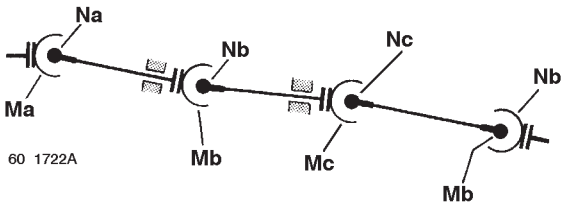


Rule for sign β:
Yoke N° 1 is to be considered as the reference yoke.

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

Example 1:

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

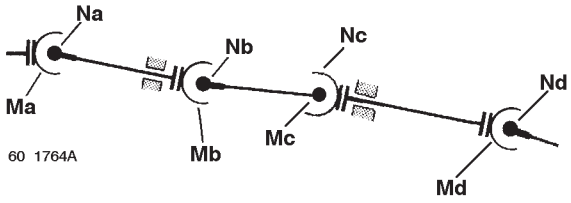


M - Leading yokes
N - Trailing yokes

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

Example 2:

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



Angular acceleration criteria θ1
Calculated criterion for a theoretical maximum speed of rotation (N).

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

$$\theta_1 \leq 270$$

θ1: criterion of acceleration in rd/s²
N: max. speed of rotation in rpm

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

Measured criteria θ2:
The angular acceleration or torsional vibrations criteria value θ2 must not exceed 1500 rd/s² at the PTO output or at any point whatsoever of the driveline for a downstream inertia of I such that I ≤ 0.2 kg/m².

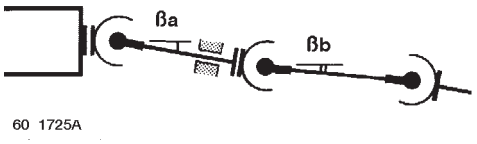
$$\theta_2 \leq 1500 \ \frac{rd}{s^2}$$

NOTE
This limit value θ2 takes into account possible dynamic amplification of the driveline.

Transversal stress criteria for prop shaft tubes and bearings.

Example β1 and β2 maximum not to be exceeded.

- **βa < 2°** for a prop shaft with bearing.
- **βb < 7°** for a prop shaft with sliding yoke.



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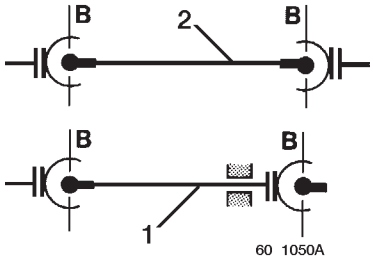
NOTE
If this 7° value has to be exceeded for space or clearance reasons, the vehicle manufacturer must be consulted.

3.4.2 Propeller shaft balancing

Permissible imbalance value (B):

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

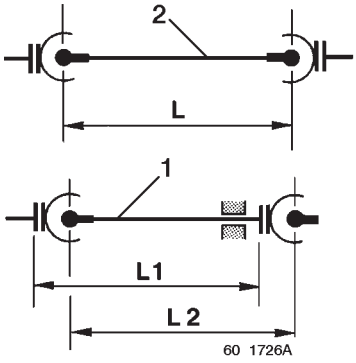


1 - 1/2 prop shaft
2 - prop shaft

NOTE
g = m = 10 m/s²

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.
L2: Distance between centres of articulation welds of a half prop shaft.
L1: 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 V.I. 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 V.I. 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 V.I. 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 2.4.1 entitled “Finishing of the sub-frame behind the cab”).

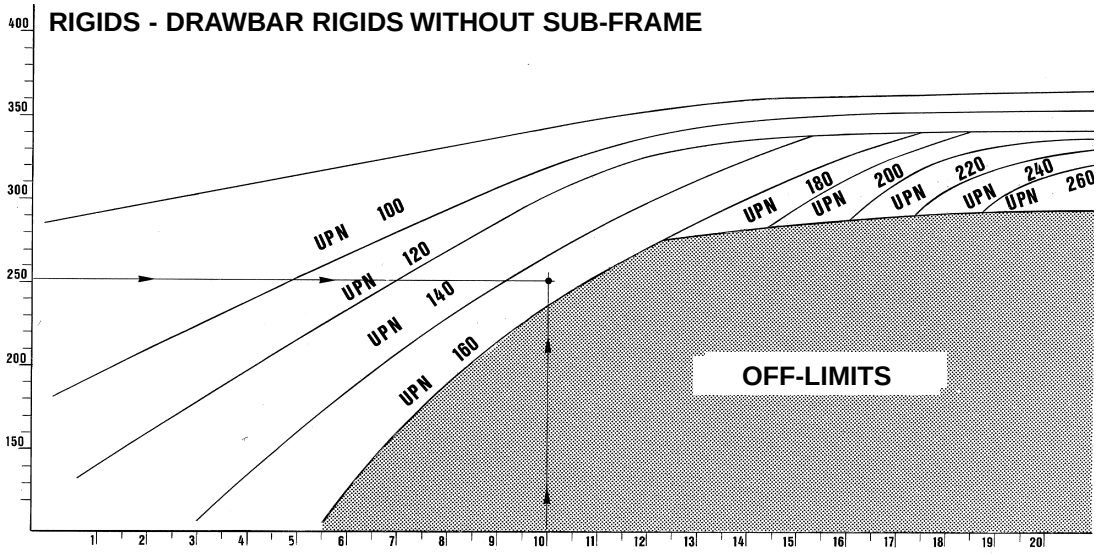
Should the crane be mounted in conjunction with another item of mobile equipment, one single sub-frame shall be designed in accordance with that item of equipment which places the most strain on the sidemembers.

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 V.I. Product Applications Department.

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

3.6.3 Crane in the rear overhang

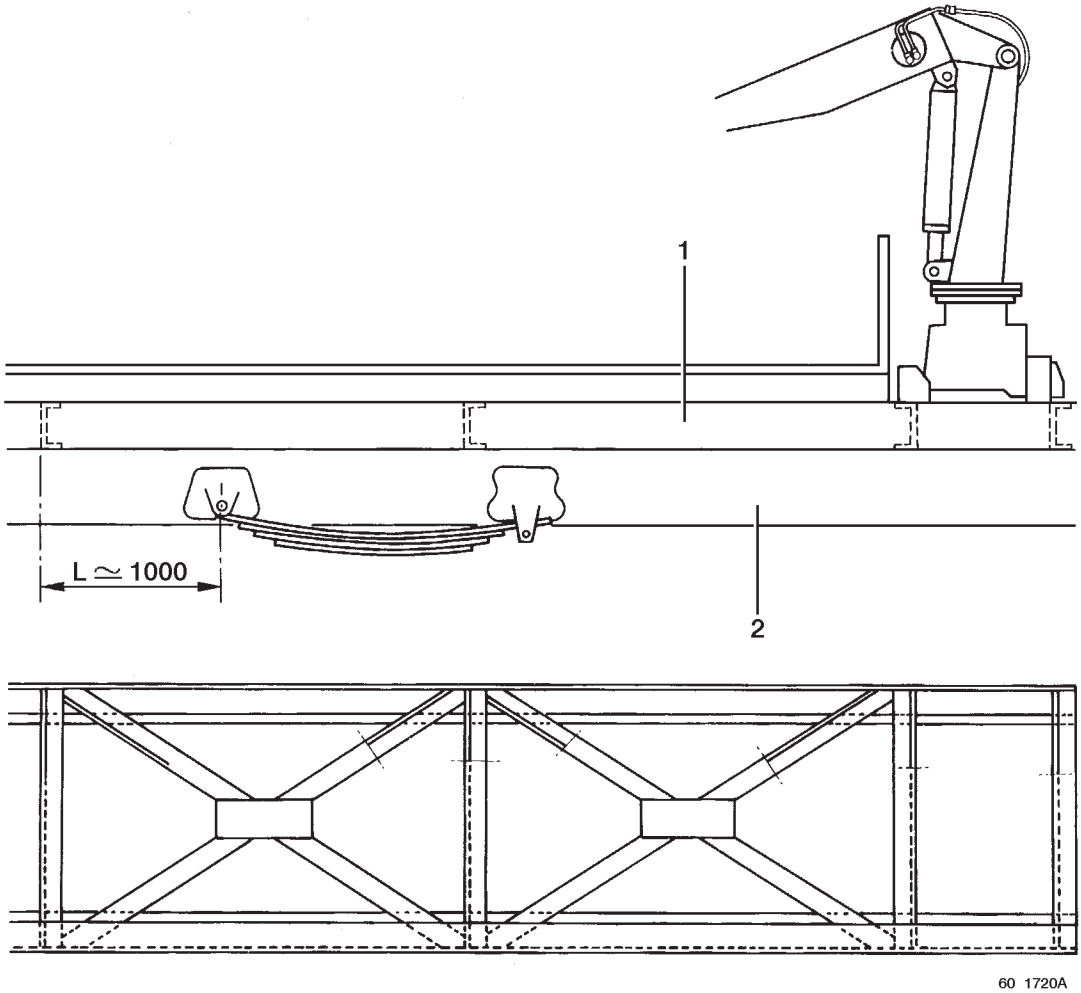
The installer of the crane is responsible with regard to compliance with the regulations, and also for the stability of the vehicle. The recommendations of RENAULT V.I. are only concerned with the attachment of the equipment.

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.
- The maximum plated front axle load shedding: 5% of the value of the weight of the chassis cab on the front axle.



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 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 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 16 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 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 torque

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.

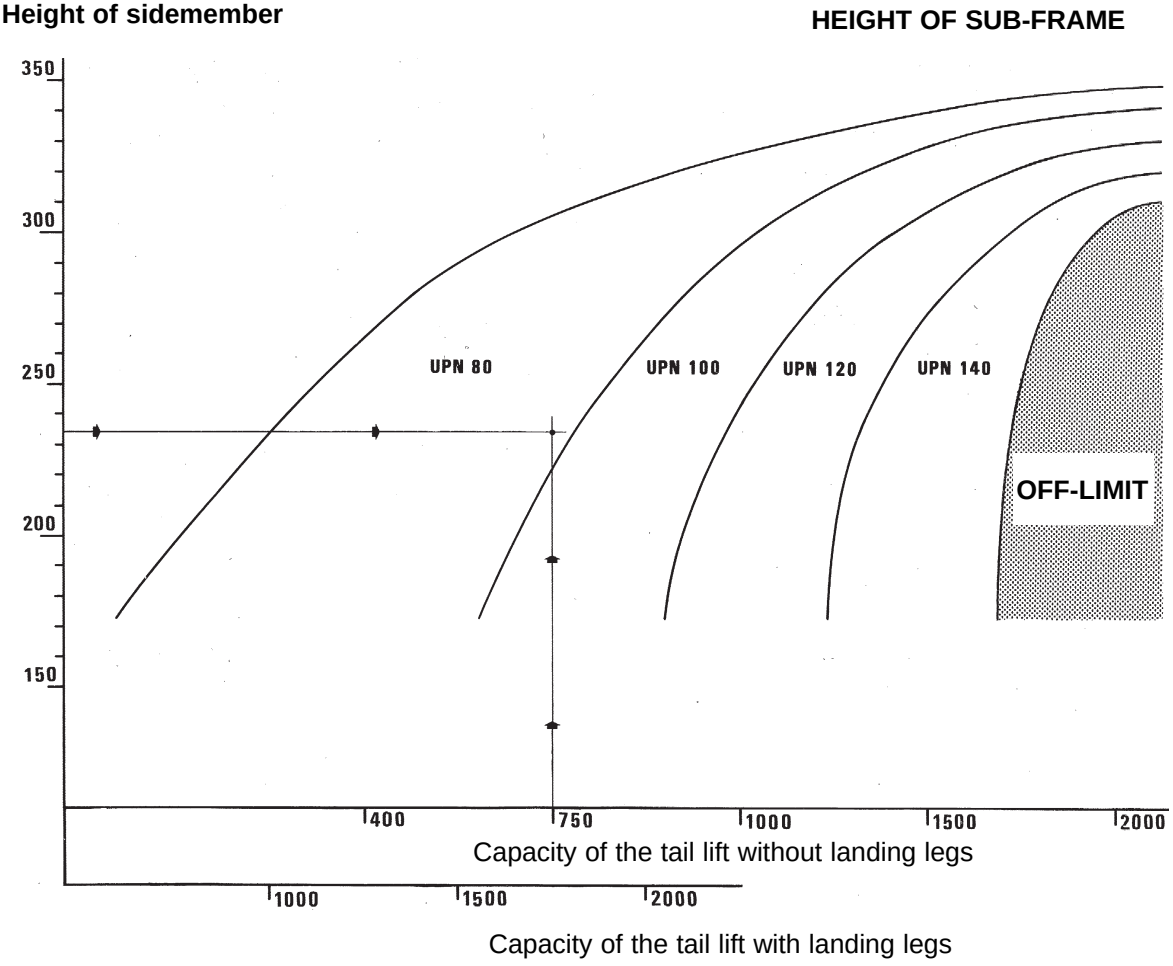
NOTE

For the mounting of tail lifts on 6x2 vehicles, it is essential to consult the RENAULT V.I. 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 aft 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 aft of the centre-line of the rear axle, in the case of all other vehicles.

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 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 Hitch coupling for rigid drawbar trailers

3.11.1 Fitting of an additional crossmember

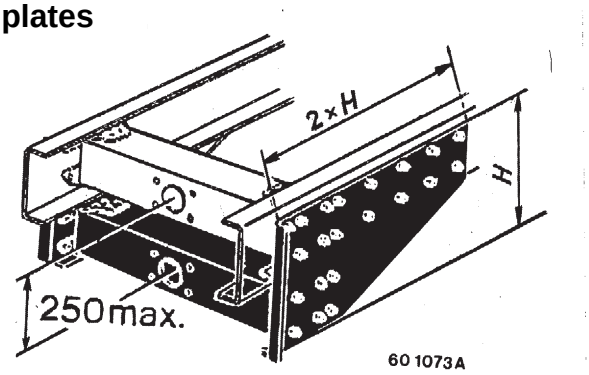
If the rear crossmember fitted is too high, there is the possibility of fitting a second crossmember underneath the other.

The fitting of this must be carried-out using reinforcement plates on the side raves of the sidemembers of the chassis. The attachment bolts of the upper crossmember are used for location of the reinforcing plates. In addition, two rows of eight bolts are to be fitted to each side which are attached to the sidemembers.

The crossmember is mounted on the reinforcement plates and has the same alignment as the crossmember used on the standard vehicle. Use all the holes in the crossmember for the attachment of this. Put in a spacer on each side to take up the space between the new crossmember and the reinforcement plate.

3.11.2 Minimum thickness of reinforcing plates

Thickness = 1.2 x thickness of the sidemember.



3.12 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 crossmember 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 ISO Standard in force.

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.

3.12.1 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.

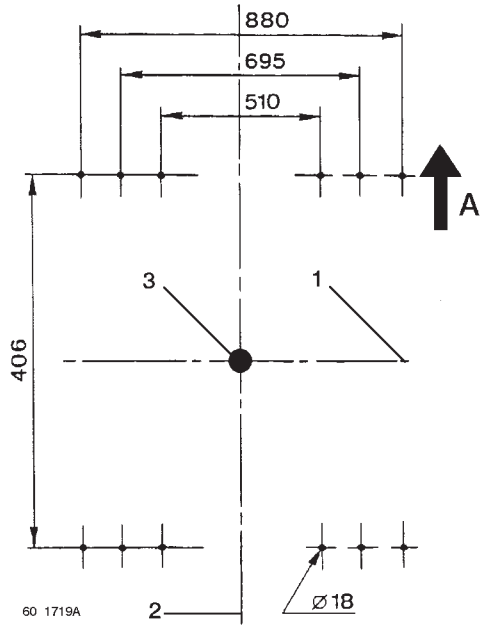
For details of the attachment of the fifth wheel, refer to the Product Applications Department or comply with the recommendations of the supplier.

These values apply equally for the attachment of the baseplate.

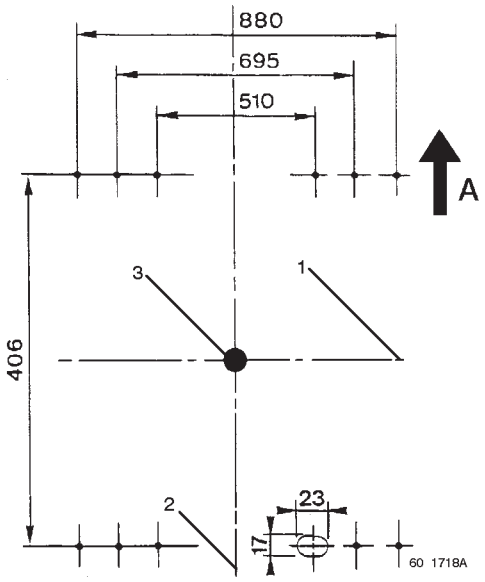
As far as swan-necked semi-trailers are concerned, which are not constructed in accordance with the ISO Standard in force, the attachment of the fifth wheel must take into account the instructions given above, whilst conforming with the capability of the tractor to manoeuvre, i.e. it must not come into 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 crossmember, you are obliged to refer to the Product Applications Department.

Drawing for drilling the baseplate for the attachment of the fifth wheel using 12 bolts Ø 16 mm (DIN Standard 74081)



Drawing for drilling the baseplate for the attachment of the fifth wheel by 12 bolts Ø 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-
“MIDLUM” SPECIAL BODYBUILDING FEATURES

1. PRESENTING THE “MIDLUM” SERIES

This MIDLUM range, the new RENAULT V.I. offer for 7.5 to 18 tonne vehicles specifically designed for distribution, replaces and completes the old range.

This modern series hinges around three types of chassis, with greatly optimized models in the major European market segments:

- 7.5 tonnes with a wide choice of power ratings,
- 12 tonnes with a multiple offer allowing maximum adaptation to different trades,
- 18 tonnes.

Two new engines cover the power units for the range:

- 4-cylinder 4200 cc (dCi 4) developing 150 or 180 hp,
- 6-cylinder 6200 cc (dCi 6) developing 220 or 270 hp.

1.1 Make-up of the range

MIDLUM B 7.5 to 10 tonnes:
- 3 power levels (150, 180, 220 hp)
- 6 wheelbases (2700*, 2950, 3250, 3850, 4450, 5050 mm)

MIDLUM B 12 tonnes:
- 2 power levels (150, 180 hp)
- 6 wheelbases (2700*, 2950, 3250, 3850, 4450, 5050 mm)

The MIDLUM B 12 tonnes is the “typical” vehicle for urban and suburban distribution.
The main features of MIDLUM B are:
- 200 x 70 mm sidemembers module,
- 17.5” tyre fitment,
- one single access step to the cab.

* for dCi 4 only.

MIDLUM C’ 12 tonnes:
- 2 power levels (180, 220 hp)
- 8 wheelbases (3070, 3350, 3650, 3950, 4550, 5150, 5750, 6480 mm)

The main features of MIDLUM C’ are:
- 220 x 70 mm sidemembers module,
- 17.5” tyre fitment,
- two access steps to the cab.

The MIDLUM C’ consists of a MIDLUM C chassis and cab with MIDLUM B powertrain and rolling gear.

MIDLUM C 12, 14 and 16 tonnes
- 3 power levels (180, 220, 270 hp)
- 8 wheelbases (3070, 3350, 3650, 3950, 4550, 5150, 5750, 6480 mm)

The main features of MIDLUM C are:
- 220 x 70 mm sidemembers module,
- 19.5” tyre fitment,
- two access steps to the cab.

MIDLUM HD and Construction 12, 14 and 16 tonnes
- 2 power levels (220, 270 hp)
- 5 wheelbases (3070, 3350, 3950, 4550 mm)

The main features of MIDLUM HD and Construction are:
- 220 x 70 mm sidemembers module,
- 20” or 22.5” tyre fitment,
- two access steps to the cab,
- sheet metal bumper.

The MIDLUM HD is proposed for export and the MIDLUM Construction is officially approved for EEC.
These vehicles consist of a MIDLUM C chassis and cab with sheet metal bumper and 22.5” tyres for better ground clearance.

MIDLUM 18 tonnes:
- 2 power levels (220, 270 hp)
- 11 wheelbases (3650, 3950, 4250, 4550, 4850, 5150, 5450, 5750, 6050, 6480, 6780 mm)

The main features of MIDLUM D are:
- 244 x 70 mm sidemembers module,
- 22.5” tyre fitment,
- two access steps to the cab,
- sheet metal bumper for Buildings & Public Works version (wheelbases 3650 to 4550 mm).

MIDLUM 4x4 TA (all-wheel grip) and TC (unkept tracks):
- 11, 13, 15 tonnes for export, in TC version only,
- 12, 13, 14, 15, 16 tonnes for EEC,
- 1 power level (220 hp),
- 4 wheelbases (3070, 3350, 3650, 3950 mm).

The main features of MIDLUM 4x4 are:
- 220 x 70 mm sidemembers module,
- 19.5” tyre fitment (twin fitment for TA only), 20” or 22.5” (single tyre fitment at rear possible for TC),,
- two access steps to the cab,
- sheet metal bumper.

The MIDLUM range, the perfect adaptation to all trades:
- a comprehensive offer for all collection and distribution activities,
- an optimized offer for express delivery and building trades with specific models,
- a specific offer for long-distance haulage,
- a vehicles offer dedicated to bodybuilders (tankers, refuse collectors, road sweepers...).

This search for perfect adequation between the activity and the vehicle is expressed through the attributes of the new MIDLUM range:
- Compactness connected with overall cab width and overhang, and reduced front overhang.
- Loading capacity with tare weight among the best on the market (MIDLUM B 12 tonnes “payload champion” with a tare weight below 3300 kg).
- Accessibility to loading with an unladen height among the best on the market.
- Safety by the adoption of “all-disc” brakes.
- Adaptation to all trades through the “Trade” vehicles offer and development of pre-arrangements for the fitting of bodies.
- The determination to fully respond to the different trades of the intermediate series is fully expressed in the range of cab appointments that constitute an innovation in the world of distribution, both as regards the diversity and the equipment comfort level.
- The result of the work conducted in common with bodybuilders and the pre-arrangements for the fitting of bodies ensure bodybuilders and users time savings and product quality.

These pre-arrangements concern the assembly of tail lifts, behind-cab cranes and other equipment items. They are completed by an “Electrical pre-arrangements” pack intended to facilitate the fitting of electrical features (for a full description, see “Trade packs and vehicles” chapter).

1.2 Changes to “MIDLUM”

- engines equipped with common rail fuel-injection and electronic management offering new power ratings:
  . dCi 4 & dCi 6 available on MIDLUM B, C’, C
  . dCi 6 available on MIDLUM HD & Construction.
- new oil sumps,
- fuel filters in LH front wing,
- fuel prefilter (option),
- new gearbox crossmember,
- new closing crossmember fastened to sidemembers web,
- battery compartment and air tanks superimposed on the entire series, (configuration identical to MIDLUM B),
- air-operated auxiliary equipment identical on all the vehicles,
- new gearboxes,
- discontinuation of soundproofing screens behind cab and on gearbox,
- front run-under guard (option),
- 4-spring cab suspension on MIDLUM D 18 tonnes,
- new instrument panel and new display (with new functions).

1.3 Electronic management of “MIDLUM” vehicles

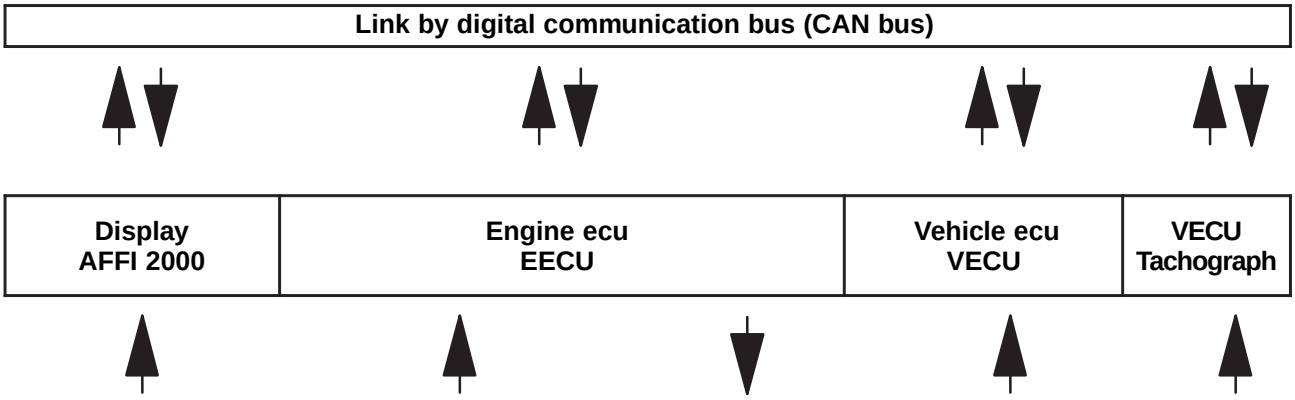
1.3.1 Operating principle

Engine electronic management is used to improve engine performance while optimizing fuel consumption and pollutant emissions (in order to meet Euro 3 standard).

The electronic system consists of two principal electronic control units:
- the **EECU** (Engine Electronic Control Unit):
This is located in the battery compartment and manages, among other things, the fuel pump solenoid valves, the FOWA exhaust brake... on the basis of information it receives from the different engine, speed, air temperature, fuel pressure... sensors.
- the **VECU** (Vehicle Electronic Control Unit):
This is located at the side of the dashboard electrical distribution panel and manages operation of the different vehicle equipment items (windscreen wash/wipe...), controls (accelerator, parking brake, electric retarder...), together with “bodybuilder” functions (PTO, related engine speeds...).

An instrument panel display (AFFI 2000) makes the interface between vehicle and driver. Not only classic information such as distance travelled, average or instant fuel consumption... is displayed, but also information on the state of the vehicle or its body (tailgate incorrectly closed, van lighting in service...) coupled in case of danger with the STOP warning light or a buzzer.

All these modules are interlinked by a digital communication bus (CAN bus) that allows them to exchange the necessary orders and information.



Warning lights: - battery charge - air suspension	**Sensors** - oil level / pressure - coolant temperature - air pressure / temperature - flywheel speed - injection pressure	Electric injectors	**Vehicle information** - accelerator pedal - cruise control and exhaust brake control - PTO engaged, brake and clutch pedals, parking brake... sensor - windscreen wash/wipe...control	control Gearbox sensor
Direction change lights and indicators	Chassis-mounted stop control	HP pump solenoid valves		
Defects / wear: - ABS, transponder, air suspension, brake pad wear...		EGR solenoid valve		
		Exhaust brake solenoid valve		

It is forbidden to cut the engine ECU wiring harness located in the battery compartment (for extension or shortening purposes).
Any changing in position must be done in an area permitted by range of movement of the wiring harness - take care to protect the ECU against splash and spray.

1.3.2 Bodybuilders' electrical pre-arrangements

For a detailed description of the electrical pre-arrangements, wee the Trade Packs chapters. The vehicle electrics is managed by the Vehicle ECU and there are two electrical pre-arrangements levels:
- electrical pre-arrangement N° 1 dedicated to vans with tail lifts for control of lighting, switching on machines, wiring of side lights...
- electrical pre-arrangement N° 2 dedicated to trades for management of PTOs and related engine speeds...

1.4 Warning

Any work on the fuel system is forbidden.
On engines equipped with common rail fuel-injection operating at very high pressure, the presence of air may lead to damage to the pump.
Observe the rules governing common rail system cleanliness and bleeding, that is to be performed whenever any work is carried out on the system
For further information, consult the RENAULT V.I. Product Applications Department.

On the low pressure circuit, changing of position of a fuel tank, adding unions or components, risks creating extra head losses:
- The specification risks not being met both at supply pump inlet and at pump return.
- The pressure regulation device risks malfunctioning (the system is sensitive to head losses).
- Check the air take-offs, make sure the fuel level is correct even when the vehicle is on an incline and during the brake application phases (difficulty in starting or stalling of the engine).
- The fuel filters must still be the last part before the HP pump inlet.
- The position of the prefilter must still be the same on the hydraulic circuit (between the injector return and the feed pump inlet).

On account of the use of electronic boxes, the installation of equipment may cause electromagnetic disturbance and oblige bodybuilders to proceed with new approval of the vehicle in respect of Electromagnetic Compatibility.

The management of engine speeds in PTO mode is managed by the electronics.
Any vehicle not equipped with electrical pre-arrangement N° 2 cannot be equipped with a PTO.
For trade vehicles, the subsequent installation of electrical pre-arrangements requires significant and complex intervention work (installation of cab and chassis wiring harnesses, re-definition of vehicle and engine ECUs...).

It is forbidden to walk on or place heavy articles on the engine for risk of damaging the HP injector pipes and the plastic rocker covers.

Guarantee access to the air intake, exhaust and fuel supply circuits.
The radiator inlet and outlet surfaces must not be modified.
The cooling flows must be conserved.

1.5 Trade vehicle models

In order to optimize the facility of adaptation and bodybuilding and to best meet customers' expectations, MIDLUM vehicles can cascade down into models or be equipped as standard with a "Trade pre-arrangement" based on the "Normal use" model. These pre-arrangements are a combination of options allowing, when installing the equipment, to have a basic vehicle on hand adapted to the constraints of its use, equipped with various pre-arrangements thus reducing conversion work and making for easier installation work.

"Normal use"

Basic vehicle with "general use" vocation, specialized by the fitting as standard of a "Trade pre-arrangement".

"Tanker vehicle"

Tanker special features

- level 2 bodybuilder electrical pre-arrangement (see chapter B-5),
- RH sidemember cleared for the installation of specific accessories,
- punchings on chassis for fastening accessories and wing brackets,
- gearbox-mounted PTO with flange output,
- fast idling set at 1200 rpm with regulated fast idling control, (2 programmed engine speeds available, plus chassis-mounted variable speed control),
- pneumatic coupling for engagement of PTO,
- remote controlled clutch release operating ram,
- 80 litre and 130 litre main fuel tank on the left,
- reinforced front and rear parabolic leaf spring suspensions,
- tanker lateral signalling installation kit,
- ABS,
- exhaust on left side.

ADR equipment

- rear run-under guard for tanker overall width 2350 mm,
- chassis-mounted "palm switch" stop control,
- 2 kg fire extinguisher in cab,
- portable orange wander lamps in cab,
- wheel chock,
- tachograph with current limiter,
- exhaust silencer shield,
- behind-cab shield,
- pre-arrangement for fixing ADR plate,
- battery isolation switch with pneumatic control,
- ADR chassis wiring harnesses.

Options

- loose spare wheel,
- gearbox-mounted PTO with splined shaft output,
- without "ADR" ("transport of dangerous materials") equipment,
- engine hourmeter in cab,
- towing crossmember capacity > 3.5 tonnes.

For all the vehicles (other than tankers), it is possible to choose the ADR variant.

“Refuse collector vehicle”

- refuse collector bodybuilder electrical pre-arrangement (see chapter B-8),
- automatic transmission,
- gearbox-mounted continuous high-power PTO with regulated fast idling control, (2 programmed engine speeds available, plus chassis-mounted variable speed control),
- reinforced front parabolic leaf spring suspension,
- reinforced dissymmetrical rear suspension,
- vertical exhaust,
- 80 litre fuel tank,
- without rear run-under guard,
- RH door with peep window,
- reversing buzzer,
- ripper presence 30 km/h speed limiter,
- without spare wheel,
- mileometer without tachograph,
- frontview mirror,
- passenger bench seat,
- fuel tank to right,
- adapted grab handles,
- central passenger holding bar.

Options
- roof level engine air intake,
- single rear tyre fitment,
- fixed passenger seat,
- engine hourmeter in cab.

“Road sweeper vehicle”

- level 2 bodybuilder electrical pre-arrangement (see chapter B-5),
- dissymmetrical rear suspension,
- right-hand drive,
- LH door with peep window,
- lateral exhaust,
- plastic 80 litre main fuel tank,
- with run-under guard,
- mileometer without tachograph,
- with battery isolation switch,
- reversing buzzer,
- roof level engine air intake,
- without spare wheel,
- frontview mirror.

“Light fire tender vehicle”

- fire brigade bodybuilder electrical pre-arrangements,
- EATON 4106 OD gearbox + power take-off 2903P,
- 4-door cab (6/7 places),
- reinforced front parabolic leaf spring suspension,
- reinforced rear parabolic leaf spring suspension,
- lateral exhaust with internal outlet,
- plastic 130 litre main fuel tank,
- adjustable fast idling,
- lamps mounted on lighting bar,
- pneumatic battery isolation switch,
- loose spare wheel,
- 9.5 R 17.5 XYZ tyres,
- white bumper,
- cab pre-arrangements (working spotlamp with remote control, radio antenna, earth braid on doors, foot-operated horn control, special steering column trim, self-adhesive reflectors on doors...).

Options
- blue revolving beacons.

“Buildings and public works vehicle”

- level 2 bodybuilder electrical pre-arrangement (see chapter B-5),
- glazed cab rear wall,
- gearbox-mounted PTO, engine speed limitation 1400 rpm, PTO engaged,
- rear drive axle differential lock,
- without run-under guard (depending on country),
- towing crossmember and hook capacity 3.5 tonnes,
- front and rear parabolic leaf spring suspensions,
- 2-place bench seat,
- changing of position of air braking appliances for installation of cab tilting ram.

Options
- vertical exhaust,
- roof level engine air intake,
- engine hourmeter in cab,
- pre-arrangement for installation of a crane.

1.6 Make-up of “Trade packs”

“Crane” installation pre-arrangement

- level 2 bodybuilder electrical pre-arrangement (see chapter B-5),
- reinforced front and rear suspensions,
- crane fastening plates,
- gearbox-mounted PTO with regulated fast idling control, (2 programmed engine speeds available, plus chassis-mounted variable speed control).

Options
- vertical exhaust,
- pre-arrangement for engine hourmeter in cab,
- with rear run-under guard for platform body.

For a tipper vehicle, provide only additional crane support plates.

“Tail lift” installation pre-arrangement

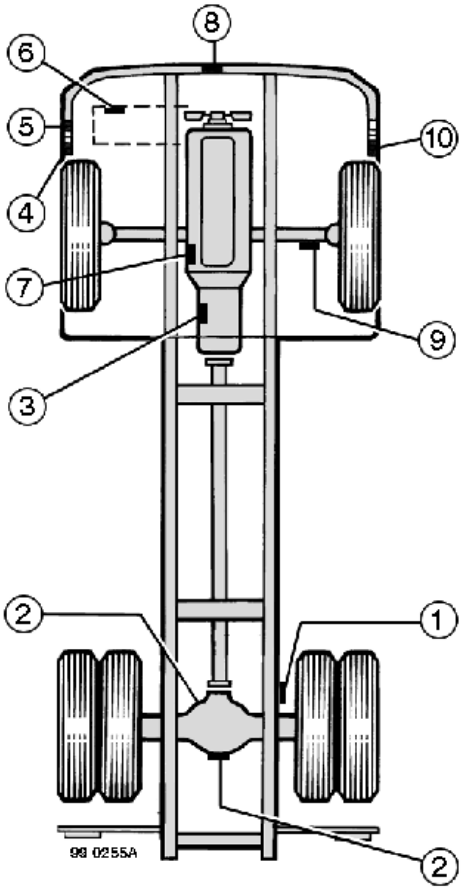
- level 1 bodybuilder electrical pre-arrangement for installation of a tail lift (see chapter B-4),
- reinforced rear suspension,
- without rear run-under guard (option for column type tail lifts),
- 80 Amp alternator,
- 170 Amp-hour batteries,
- 200 Amp fuse-holder located in battery compartment,
- tail lift earth available in the rear overhang,
- earth screw in rear overhang.

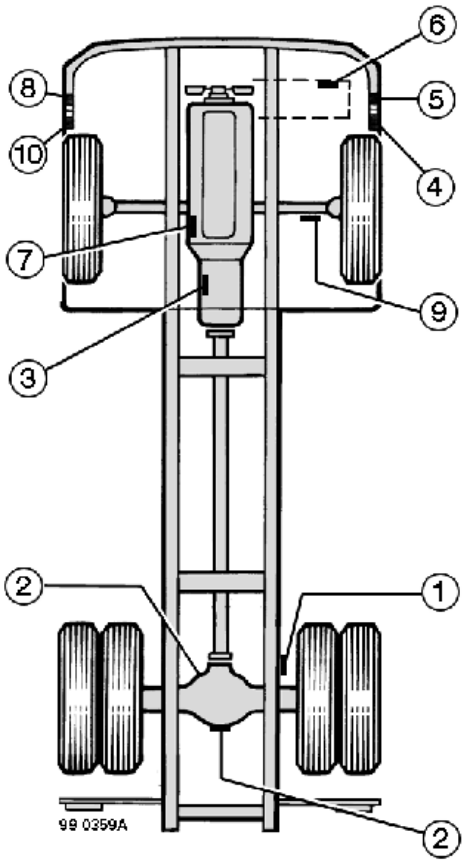
Options
- level 2 bodybuilder electrical pre-arrangement (see chapter B-5).

2. GENERAL REMARKS ON “MIDLUM Euro 3” SERIES

2.1 Identification of the vehicle

LH drive vehicles **RH drive vehicles**





View from above

Position of on-vehicle identification plates

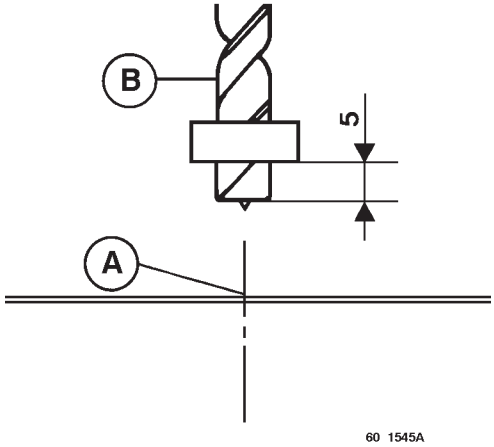
1 - chassis
2 - rear drive axle
3 - gearbox
4 - manufacturer’s plate
4 - pollution index
5 - manufacturing plate
6 - tachograph plate (if fitted)
7 - engine
8 - CAM reference
8 - paint reference
9 - front axle
10 - load sensing valve plate

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

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



A - Bodywork panel
B - Centring drill with stop:
Ø 9.2 for crimping nut Ø 6 mm.
Ø 11.2 for crimping nut Ø 8 mm.

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

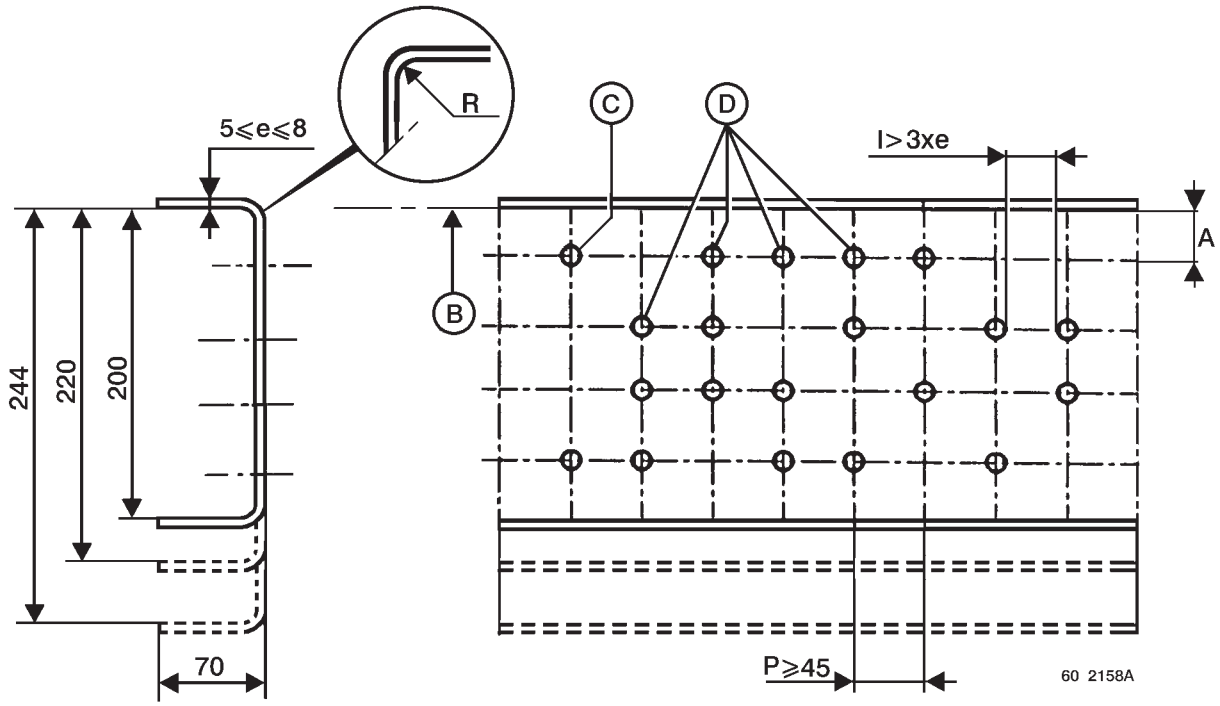
Method
Use a centring drill with stop positioned on the bit to drill the roof.
Drilling depth: 5 mm max. for fastening crimping nut.

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 V.I. reference centre-line)
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 28 mm.

C - Recommended drilling diameter:
13 mm for assembling elements (tool box...)
17 mm for assembling built-on units (tail lifts...)

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

Protect the metal with a zinc aerosol spray, ref. N° 77.01.406.425.
Retouch paintwork with a grey chassis aerosol paint spray, ref. N° 50.01.848.147.
These consumables are available from the RENAULT V.I. Spare Parts department.

2.3 Precautions

2.3.1 Protection of wiring harnesses

When welding near to the vehicle, if you use a disk sander, take care to protect electrical wiring harnesses and air pipe bundles against any spatter that might damage them.

2.3.2 Protection of electrical installation prior to welding

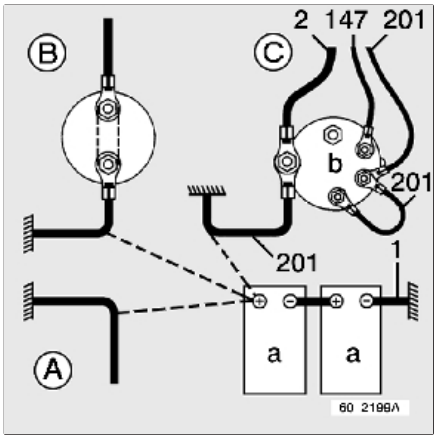
Important operations to be carried out without fail, prior to welding.

The vehicle is equipped with numerous electrical circuits. Before any operation involving electric arc welding, disconnect the positive (+) cable from the battery and connect it to earth.
Place the earthing clamp as near as possible to the point of welding, but never on rotating parts (prop shaft, fan hub, etc.) nor on a sub-assembly 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.

Diagram A: vehicle without master switch

Diagram B: vehicle with mechanical master switch
The master switch must be closed.

Diagram C: vehicle with electrical master switch
Disconnect the 2 cables and join them together.



a - batteries
b - electromagnetic master switch

Marking of cables:
1 - battery earth
2 - after master switch positive (+) power supply
147 - to engine immobilizer (master switch control)
201 - before master switch positive (+) power supply

After welding, reconnect all the cables finishing with the earth cable (1).
Other precautions before welding: refer to chapter “Precautions before welding” in the “General Features” section.

When welding in the MIDLUM cab, place the earthing clamp as close as possible to the point of welding.

Welding must be an exceptional operation on our vehicles (cab extension, welding of crane frames...).

When installing the wiring harnesses, pay attention to hot areas (exhaust, turbocharger, electric retarder).

Bodybuilder wiring harnesses can be routed parallel to the vehicle harnesses with independent fastenings (do not make use of the vehicle wiring harnesses to connect them to bodybuilder harnesses).

Pay attention to cab movements at articulation level for wiring harnesses that connect the chassis and the cab.

2.4 Minimum load on front axle

In order to guarantee suitable vehicle ride behaviour, stability and handling under maximum safety conditions, the minimum recommended load on the front axle must be applied whatever the vehicle load and equipment conditions.
For special cases, consult the RENAULT V.I. V.I. Product Applications Department.

Vehicle equipment	Minimum load on front axle
Vehicle alone	25% of the vehicle gross weight
Vehicle equipped with tail lift, or loading crane to rear of vehicle	30% of the vehicle gross weight

IMPORTANT
- Never exceed the maximum permissible load on the front axle.
- Application of the load in the rear overhang of the vehicle is detrimental to vehicle ride behaviour, stability and handling. Great prudence is recommended when driving under such conditions.
- Watch that the centre of gravity of the load is positioned laterally as close as possible to the centre of the vehicle.

2.5 Soundproofing screens and heat shields

2.5.1 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).

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

2.5.2 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.

2.6 Side impact beams

Side impact beams must comply with the laws in force and should not impede access to chassis components (spare wheel, air and fuel tanks, air dryer...).

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 in the MIDLUM CD-ROM.
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 **“Normal”**).

Rigid

Normal	Tipper	Tanker	RCV	Road sweeper

or

Tractor

5 - Choose the vehicle model according to cab, GVW and wheel rims (click on **“Midlum B”**).

	Normal rigid LH drive		Normal rigid RH drive	
GVW Rims	Day & Sleeper cab	4-door cab	Day & Sleeper cab	4-door cab
7.5 to 12 T-17.5”	**Midlum B**	Midlum B	Midlum B	Midlum B
12T-17.5”	Midlum C’	Midlum C’	Midlum C’	Midlum C’
12T à 16T-19.5”	Midlum C	Midlum C	Midlum C	Midlum C

6 - Choose the drawing N° according to wheelbase and engine power rating (click on “**5010496019**”).

Midlum B Rigid (day & sleeper cab)		
Wheelbase	135 - 150 hp	180 - 210 hp
2700	5010496017	5010463960
3250	5010496018	5010463961
3850	**5010496019**	5010463962
4450	5010496020	5010463963
5050	5010496021	5010463964

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

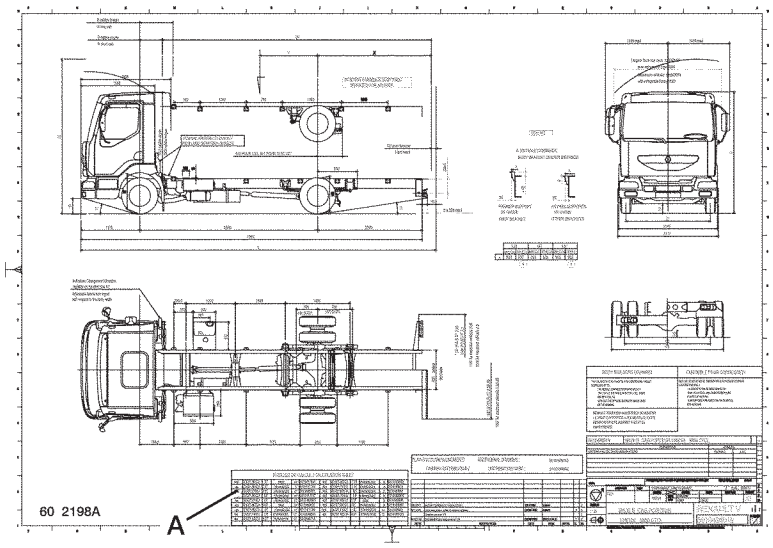
Drawing N° 5010196019

Visualization of PDF format

Recording of DXF format

Access to grids

8 - 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. 5010417757).



9 - Go back to the last screen.

10 - Click on **“Access to grids”.**

Drawing N° 5010196019

Visualization of PDF format

Recording of DXF format

Access to grids

11 - Write down the grid N° “**5010417767**”, click on “**Find**”.

Grid N° 5010417767

Find

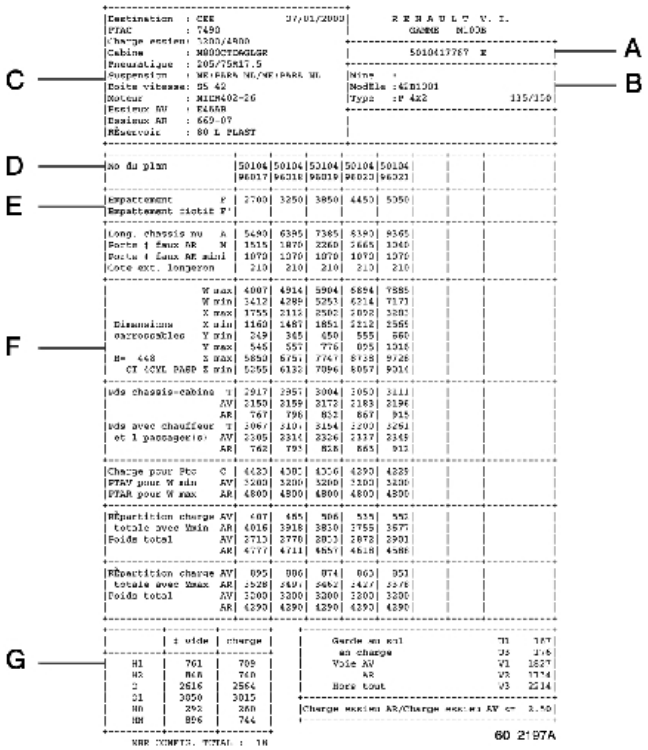
12 - Click on **“Visualization of PDF format).**

Grid N° 5010417767

Visualization of PDF format

13 - Visualize the 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 entrance dimension
G - height



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

3.3 Body entrance dimension

3.3.1 Day cab (1.6 m)

Vehicle		Minimum body entrance dimension			
Type	**Driving position side**	**B1**	**B2**	**B3**	**B4**
MIDLUM B 4 cylinders	left	448	540	600	448
	right				
MIDLUM B 6 cylinders	left	423			423
	right				492
MIDLUM C'/C 4 cylinders	left	398	490	490	398
	right				
MIDLUM C'/C 6 cylinders	left	373	490	490	373
	right				442
MIDLUM HD/construction 6 cylinders	left	401	503	505	401
	right		490		442
MIDLUM D 6 cylinders	left	373	490	490	373
	right		490		442
MIDLUM 4x4 TA 6 cylinders	left	401	503	505	401
	right		490		442
MIDLUM 4x4 TC 6 cylinders	left	401	503	505	401
	right		490		442
MIDLUM RCV	left			490	
Road sweeper	right		490		

B1 - minimum body entrance dimension for version with under-floor engine air intake
B2 - minimum body entrance dimension for version with roof level engine air intake
B3 - minimum body entrance dimension for version with vertical exhaust
B4 - minimum body entrance dimension for version with air intake to aft of cab

NOTE
The values **(B1 - B2 - B3 - B4)** are calculated for a body positioned at a height more than 130 mm from the upper face of the sidemembers.
To move the position of the side direction indicator lights (see chapter B-3.10).

3.3.2 Behind-cab surrounds

To prevent the components forming the rear surrounds of the cab from entering into contact with the body-work, a minimum body entrance dimension, depending on the height of the sub-frame employed, is to be observed.

The components forming the rear surrounds of the cab are:

- direction change indicator lamps,
- cab rear fireproof screen for ADR vehicles,
- front wings and brackets.

Key to diagram on next page

A - front axle centre-line

C - between-centres distance between front axle and rear extremity of direction indicator lamps (see chapter B-3.10).

B - body entrance dimension

F - height of front wing bracket in relation to the chassis

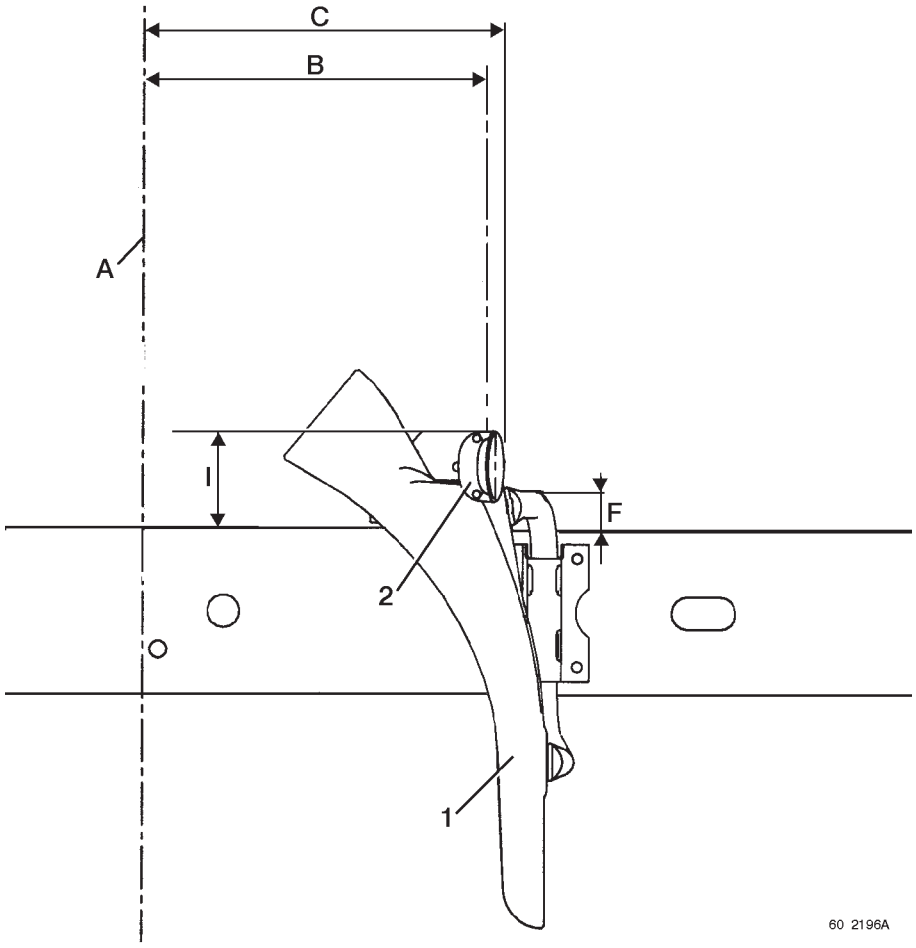
I - protrusion of side direction indicator lamps in relation to top of sidemembers

1 - front wing

3 - side direction change indicator lamp

Table of overall dimensions of components to the rear of the cab

	MIDLUM B	MIDLUM C'/C	MIDLUM HD/ Construction	MIDLUM D
C	470	420	400	
F	50	63	50	
I	130		260	



3.3.3 Sleeper cab (2 m)

Vehicle		Minimum body entrance dimension			
Type	**Driving position side**	**B1**	**B2**	**B3**	**B4**
MIDLUM B 4 cylinders	left	770	876	950	770
	right				
MIDLUM C'/C 4 & 6 cylinders	left	720	826	870	720
	right				
MIDLUM HD/Construction	left	720	826	910	
	right				
MIDLUM D 6 cylinders	left	720	826	870	720
	right				

B1 - minimum body entrance dimension for version with under-floor engine air intake
B2 - minimum body entrance dimension for version with roof level engine air intake
B3 - minimum body entrance dimension for version with vertical exhaust
B4 - minimum body entrance dimension for version with air intake to aft of cab

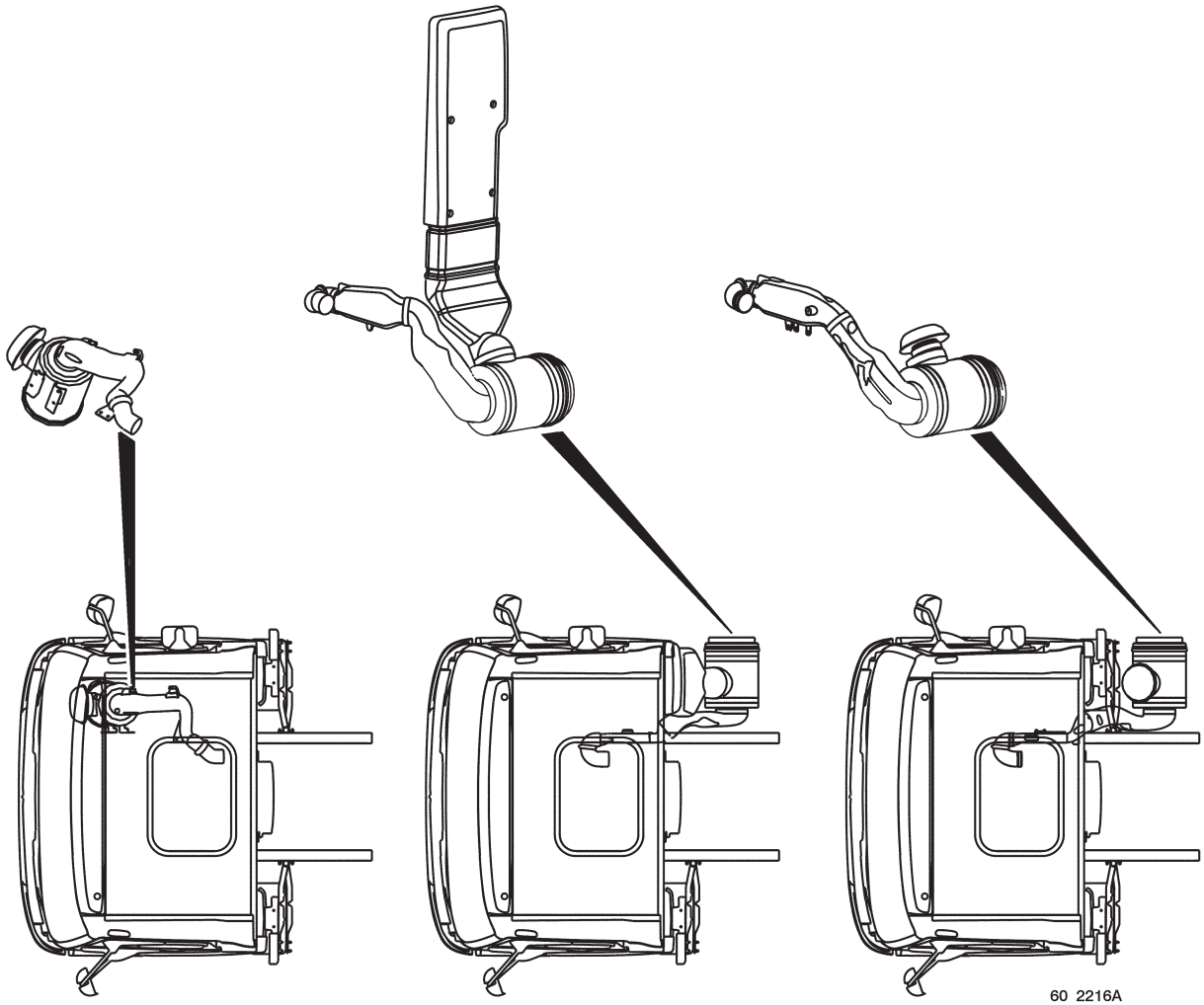
3.3.4 4-door cab

Vehicle	Minimum body entrance dimension
MIDLUM B 4 cylinders	1752
MIDLUM C'/C 4 cylinders	1702
MIDLUM HD/Construction 6 cylinders	
MIDLUM 4x4 TA 6 cylinders	
MIDLUM 4x4 TC 6 cylinders	

3.3.5 Presentation of the different air intakes

When changing the position of equipment or for trade applications (refuse collectors, road sweepers...), take care to not take up the place of the original filtration system or change its position. In fact, its size and position are defined to get optimum yield from the engine by avoiding the ingress of foreign matter (water, gravel, dust...).

When fitting the vehicle body, take care to maintain access to the air filter box so as to be able to replace the filter.



1 - under-floor engine air intake
2 - roof level engine air intake
3 - air intake to aft of cab

Capability of adjusting the behind-cab air intake nozzle according to bodybuilder requirements.

3.4 Sub-frame sections

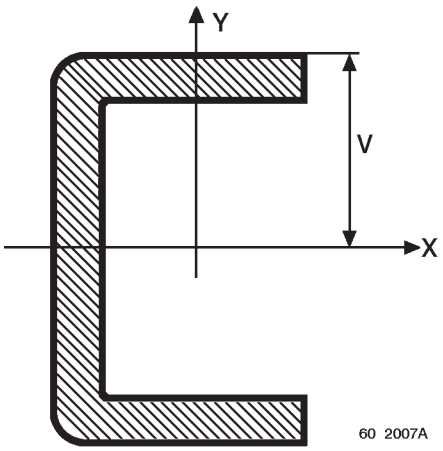
3.4.1 Minimum height according to range of suspension movement

A minimum sub-frame height is imposed by the range of movement of the rear suspension. The use of a subframe with insufficient height would result in possible damage to the underbody or equipment due to friction by the rear wheel tyres.

Minimum sub-frame height according to suspension type		
Vehicles	**Suspension type**	
	Mechanical	**Air**
MIDLUM B 4 cylinders 7.5 tonnes	90 mm	55 mm
MIDLUM B 6 cylinders 7.5 tonnes	100 mm	60 mm
MIDLUM B 4 & 6 cylinders 10 tonnes		55 mm
MIDLUM B 4 cylinders 12 tonnes	110 mm	
MIDLUM C' 12 tonnes	80 mm	55 mm
MIDLUM C 180 & 220 12 tonnes	110 mm	60 mm
MIDLUM C 270 12 tonnes		75 mm
MIDLUM C 180 & 220 14 tonnes	120 mm	
MIDLUM C 270 14 tonnes		90 mm
MIDLUM C 180 & 220 16 tonnes		
MIDLUM C 270 16 tonnes		105 mm
MIDLUM HD 14 tonnes	145 mm	
MIDLUM construction 14 tonnes	125 mm	
MIDLUM HD 16 tonnes	160 mm	
MIDLUM construction 16 tonnes	135 mm	
MIDLUM D 18 tonnes	170 mm	150 mm
MIDLUM 4x4 TA 14 & 16 tonnes	10 mm	
MIDLUM 4x4 TC 11 tonnes	30 mm	
MIDLUM 4x4 TC 12 tonnes monte simple	100 mm	
MIDLUM 4x4 TC 13 & 14 tonnes	65 mm	
MIDLUM 4x4 TC 15 & 16 tonnes	85 mm	

3.4.2 Sub-frame minimum inertia

Vehicle	Sub-frame minimum inertia (mm4)	
	Along axis (X)	Along axis (Y)
MIDLUM B	700 000	1 250 000
MIDLUM C'		
MIDLUM C	850 000	3 500 000
MIDLUM HD Construction		
MIDLUM D 18 tonnes	1 000 000	5 505 500



Reminder of formula for calculating maximum normal surface stress

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

σ: maximum stress at surface edge (N/mm2)
Mf: bending moment (Nm)
I: surface quadratic moment (mm4)
v: distance between section extremity and neutral fibre (mm)

3.5 Finishing of sub-frame entrance dimensions

Depending on:
- cab length (day cab, sleeper 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 entrance dimension different from that of the RH side),
- provided or not with horizontal cut-outs (reduction in width), allowing passage of the cab rear soundproofing screen and the roof level air intake.

Key to drawings, following pages.
A - Front axle centre-line,
e - Width of sub-frame section,
L - Distance from centre-line of the first bracket in relation to the centre-line of the front axle,
F - Sub-frame entrance dimension (symmetrical sub-frame),
Fg - Sub-frame LH entrance dimension (asymmetrical sub-frame),
Fd - Sub-frame RH entrance dimension (asymmetrical sub-frame),
Xg - Distance between LH end of sub-frame and first bracket centre-line (asymmetrical sub-frame),
Xd - Distance between RH end of sub-frame and first bracket centre-line (asymmetrical sub-frame),
1 - Air intake pipe,
2 - Cab rear soundproofing screen,
3 - Sub-frame,
4 - First bracket,
5 - Chassis sidemember,
6 - Cab rear attachment.

IMPORTANT
ADR vehicles (transport of dangerous materials) are equipped with a screen behind the cab and a screen on the gearbox. To limit cut-outs at the extremities of the sub-frame, the recommended width of the sections is 50 mm. If this width is greater, provide horizontal cut-outs (reduction in width) allowing passage of the rear screen.

MIDLUM day cab and under-floor air intake

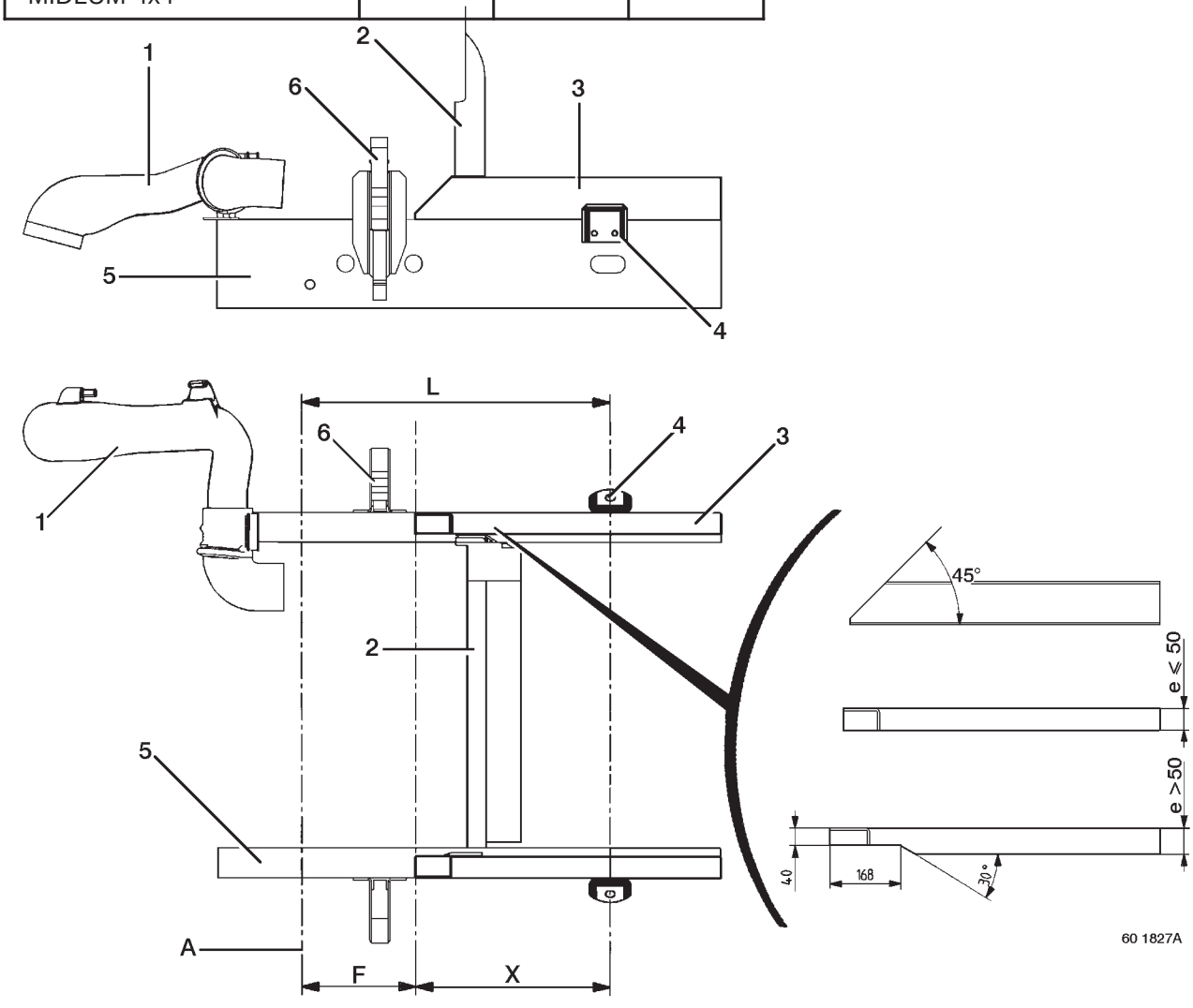
Symmetrical sub-frame finishing

Vehicle	F	L	X
MIDLUM B	273	735.5	462.5
MIDLUM C'/C	223	835.5	612.5
MIDLUM HD/ Construction			
MIDLUM D			
MIDLUM 4x4			

MIDLUM sleeper cab whatever the air intake

Symmetrical sub-frame finishing

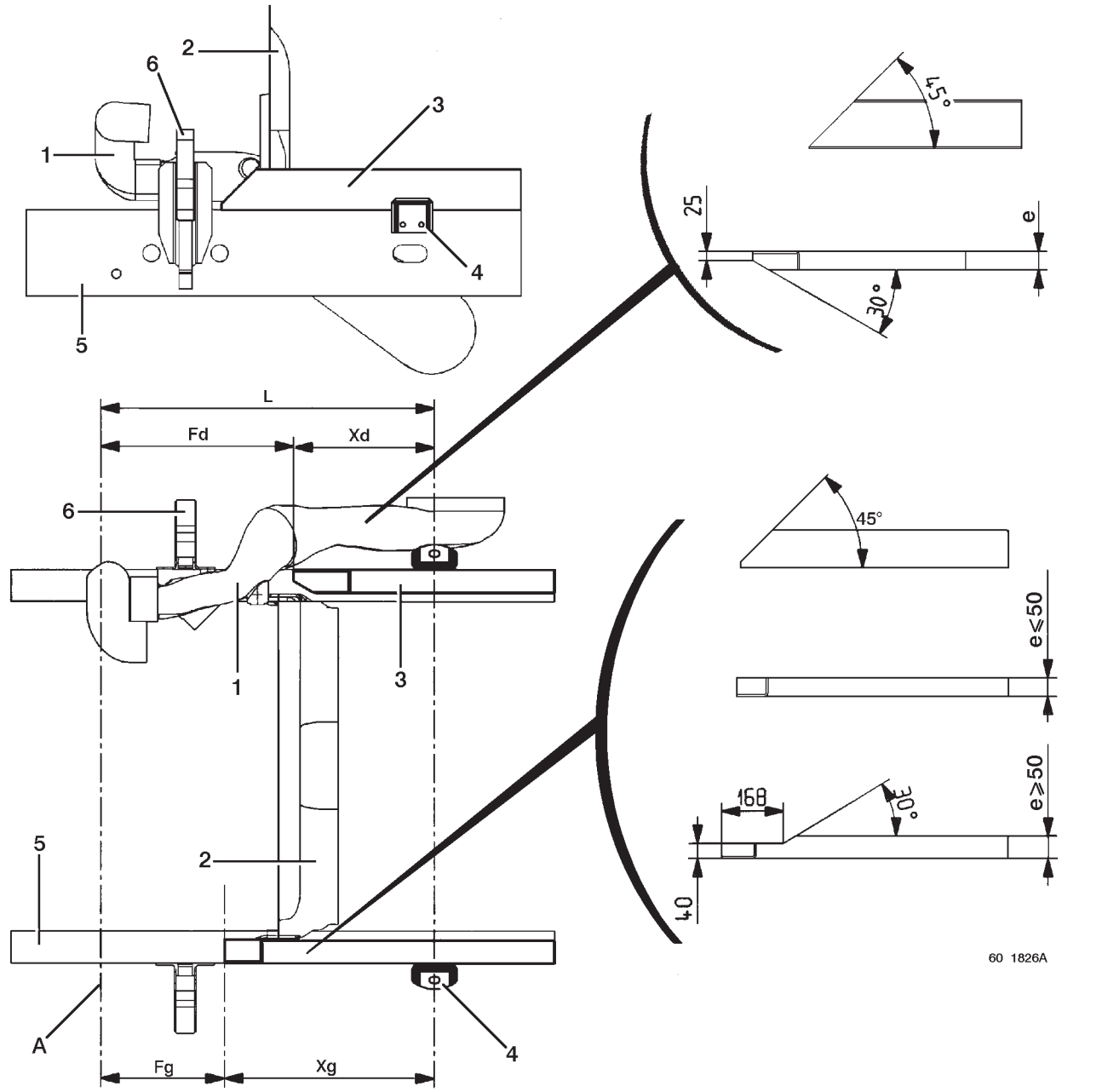
Vehicle	F	L	X
MIDLUM B	620	735.5	115.5
MIDLUM C'/C	570	835.5	265.5
MIDLUM HD/ Construction			
MIDLUM D			
MIDLUM 4x4			



MIDLUM day cab and roof level air intake

Symmetrical sub-frame finishing:
- asymmetrical sub-frame,
- cut-out on the RH side whatever the width (e) of the section.
- cut-out on the LH side if the width (e) of the section is greater than 50 mm.

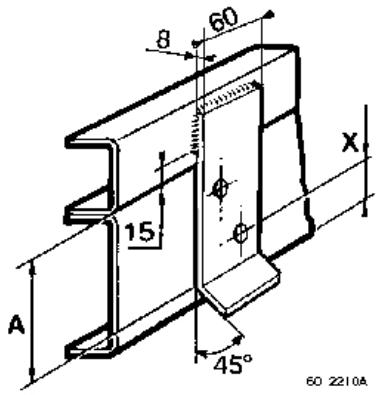
Vehicle	Fg	Fd	L	Xg	Xd
MIDLUM B	273	425	735.5	462.5	310.5
MIDLUM C'/C	223	375	835.5	612.5	460.5
MIDLUM HD/Construction					
MIDLUM D					
MIDLUM 4x4					



3.6 Lateral guiding

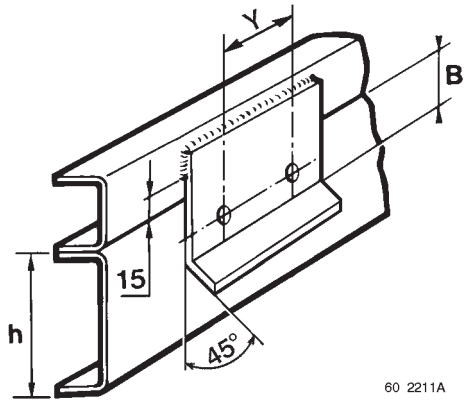
All bodies must be fitted with lateral guides to the fore and aft of the sub-frame.

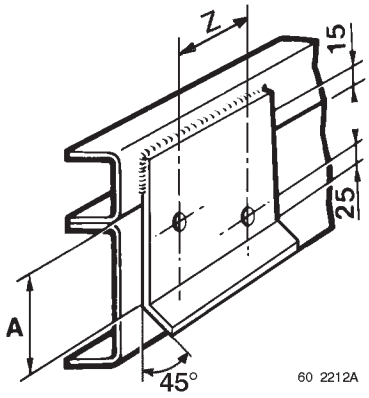
At the front:
For vehicles fitted with flush first brackets, lateral guiding must be assured by two guide plates that are:
- welded to the sub-frame,
- bolted to the sub-frame or the chassis, but never both at the same time.



IMPORTANT
For vehicles fitted with raised first brackets, the latter play the part of front guides.
The fitting of guide plates is therefore unnecessary.

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.





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

Inertia stop

All bodies or equipment must be fitted with an inertia stop to the aft of each sidemember to retain the body against motion.

3.7 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 V.I. 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 undercarriages should always be tapered towards the front (i.e. under the cab), so as to avoid sudden variations in inertia.

Behind-cab overall dimensions are given in the “Cab footprint” and “Behind-cab surrounds” chapters.

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 eat shield by the body-builder.

BANS

WE FORBID:
- Attachment of sub-frames by U-bolts, clamps or equivalent systems (hooks).
- 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 by welding to sidemembers.
- Drilling of stiffener gussets.
- Welding, notching of sidemembers, gussets or crossmembers.
- 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.

3.8 Attachment of sub-frames to brackets

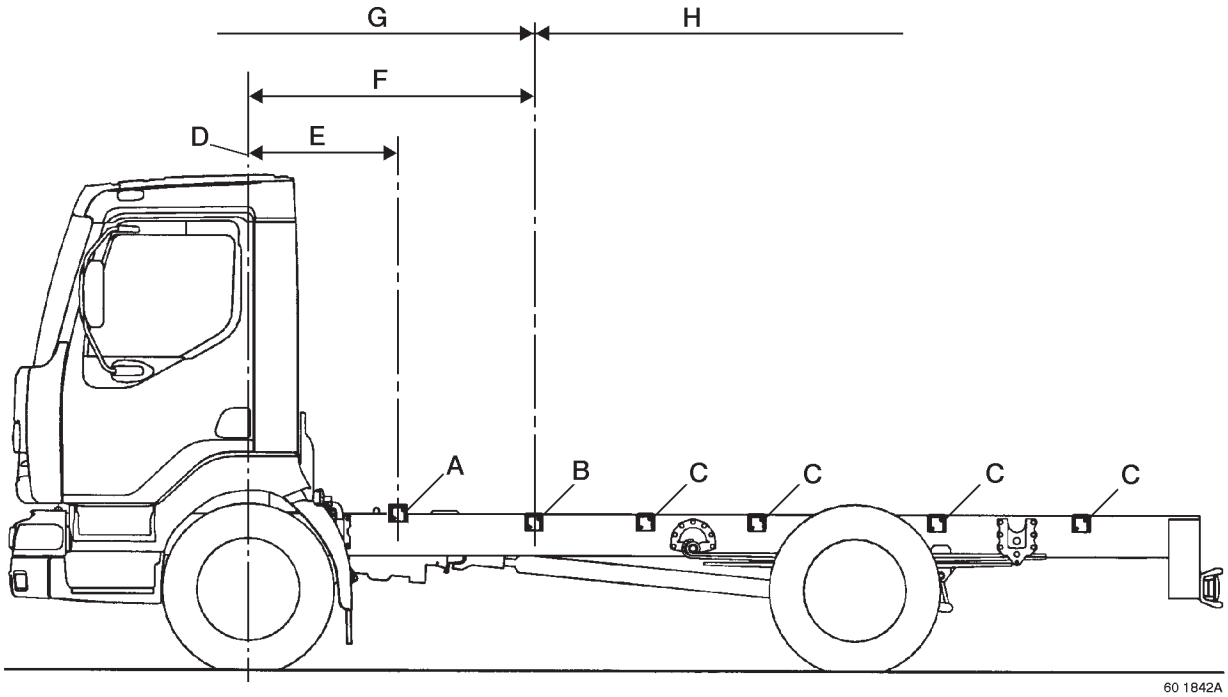
3.8.1 Fastening types

A - Flexible attachment (first bracket)
B - Semi-flexible attachment (second bracket)
C - Rigid attachment (all other brackets)

Guiding and fastening zone

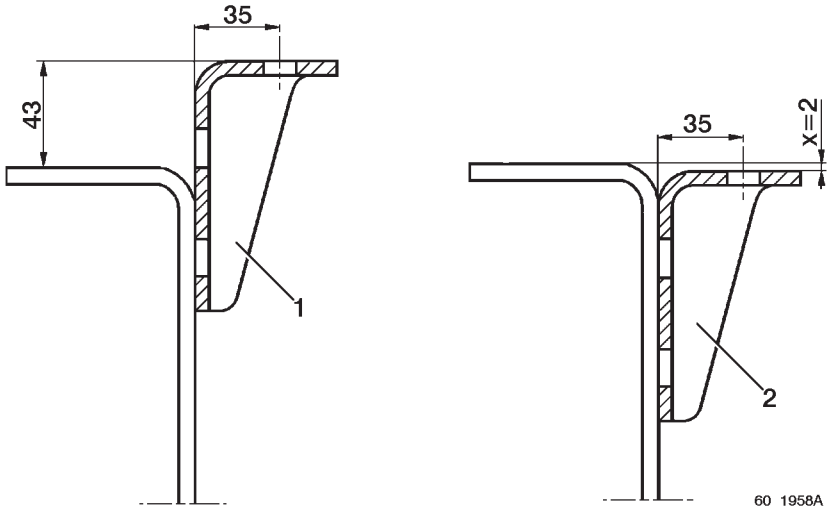
Vehicles	E	F
MIDLUM B	735,5	1302,5
MIDLUM C'/C	835,5	1585,5
MIDLUM HD/construction		
MIDLUM D		
MIDLUM 4x4		

D - Front axle centre-line
E - Flexible fastening position (**A**) (first bracket) in relation to front axle centre-line
F - Semi-flexible fastening position (**B**) (second bracket) in relation to front axle centre-line
G - Lateral guiding and elastic fastening zone
H - Guiding and rigid fastening zone
(See following pages).



Assembly conditions

Raised bracket (first bracket)
Flush brackets (other brackets)

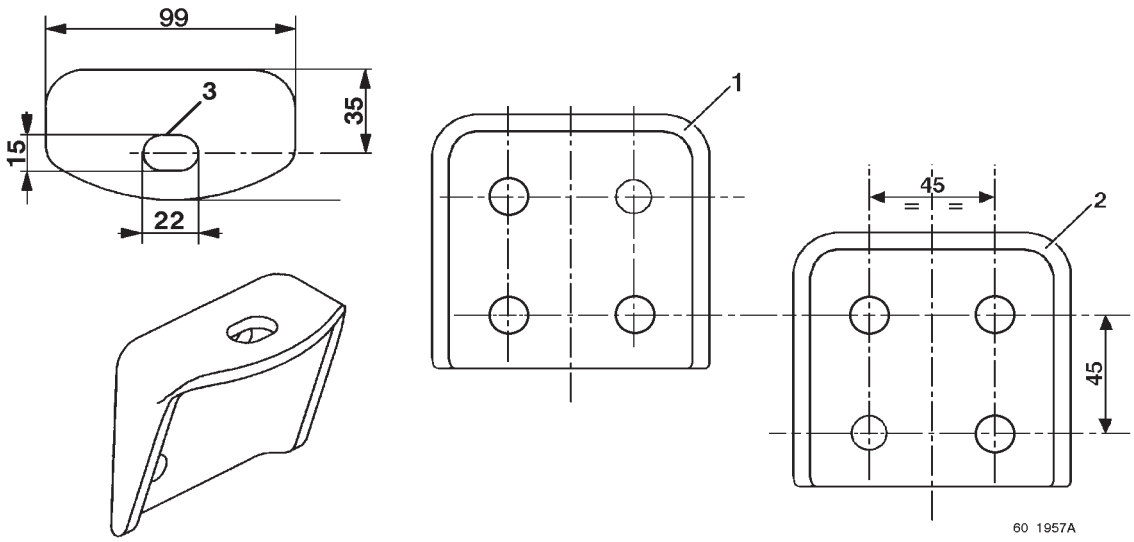


3.8.2 Vertical positioning of brackets

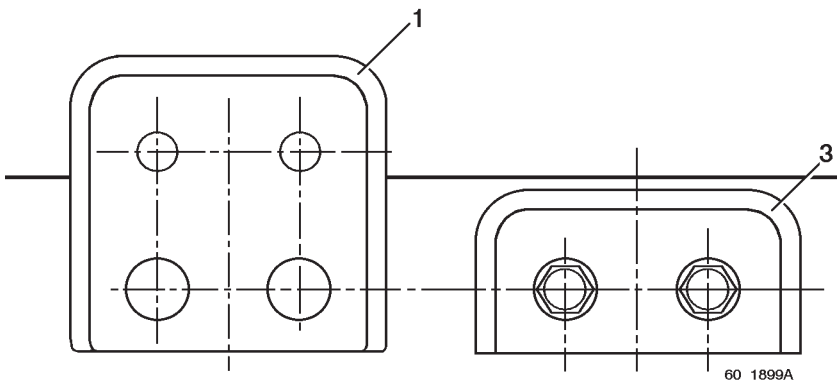
Two bracket assemblies are made on the MIDLUM chassis:

- The first bracket (**1**) is raised in relation to the other brackets.
- All the other brackets (**2**) are flush with the top face of the sidemembers.

The size and position of the slotted hole (**3**) is the same for all the brackets.



If need be, the first bracket (**1**) can be assembled in a flush position (**3**). In this case, the installation of a front lateral guide is necessary. Reduce the height of the bracket by sawing off, if necessary (see chapter B-3.6).

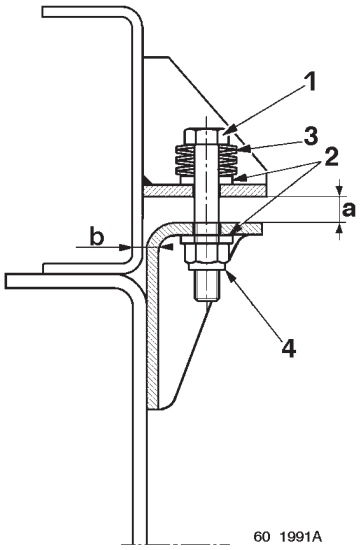


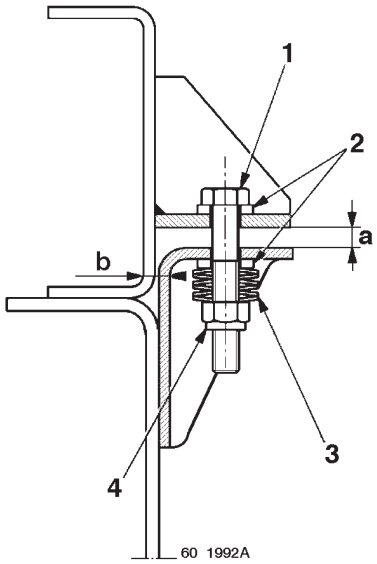
A - Flexible attachment
1 - Hexagon bolt M 14 x 150, class 10.9
2 - 2 plain washers 14 x 30 x 4
3 - 6 cone washers: (“Belleville” type)
i/d 14.5 mm
o/d 35 mm
thickness 1.8 mm
unit preload 400 kg
4 - Nut DAH M 14 class 10.9, or other locknut except nut with nylon ring (e.g. Nyloc)
a - Clearance: 10 to 15 mm max.
b - Bracket / sub-frame clearance: 2 mm minimum (for raised bracket only)

Tightening at 50% of the deflection:

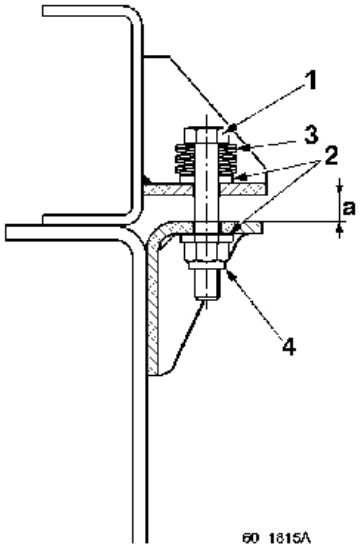
$$\frac{6 \times 1.2 \text{ (deflection)}}{2} = 3.6 \text{ mm}$$

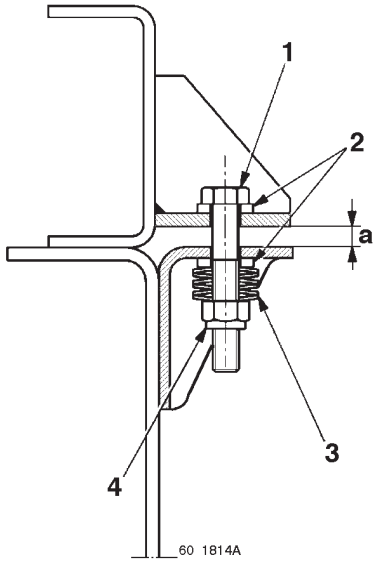
First raised bracket (works assembly)





First flush bracket (assembly reworked by bodybuilder)

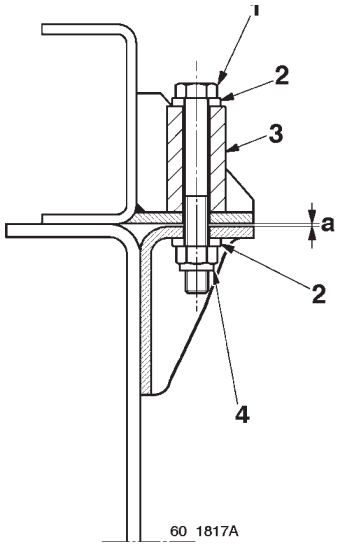


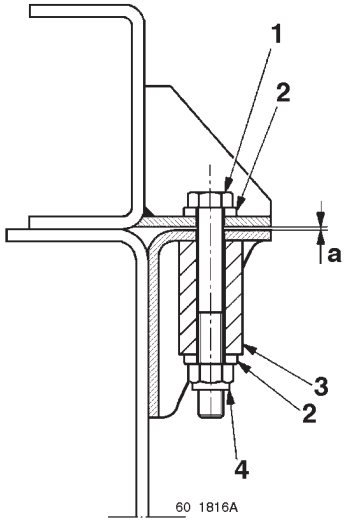


Bodywork attachment kit
The bodywork attachment kit is supplied with level 1 and level 2 electrical pre-arrangements (see chapters B-4 and B-5).

Note
An equivalent fastening technique solution is permitted (e.g. rubber sandwich mounting), if it keeps the same preload.

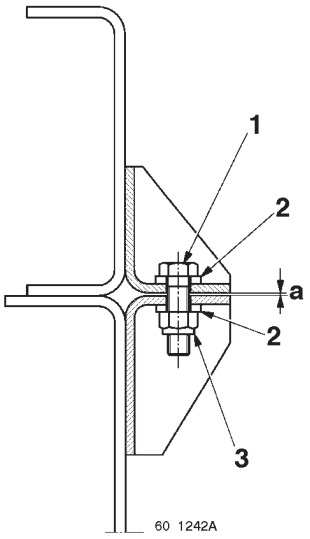
B - Semi-flexible attachment
1 - Hexagon bolt M 14 x 150, class 10.9
2 - 2 plain washers 14 x 30 x 5
3 - Steel spacer 15x38-65 (min.) (after cutting, true both faces)
4 - Flanged nut DRH M 14 class 10 or other locknut except nut with nylon ring (e.g. Nyloc)
a - Clearance: 1 to 2 mm before tightening
Tightening torque: 170 Nm





Bodywork attachment kit
The bodywork attachment kit is supplied with level 1 and level 2 electrical pre-arrangements (see chapters B-4 and B-5).

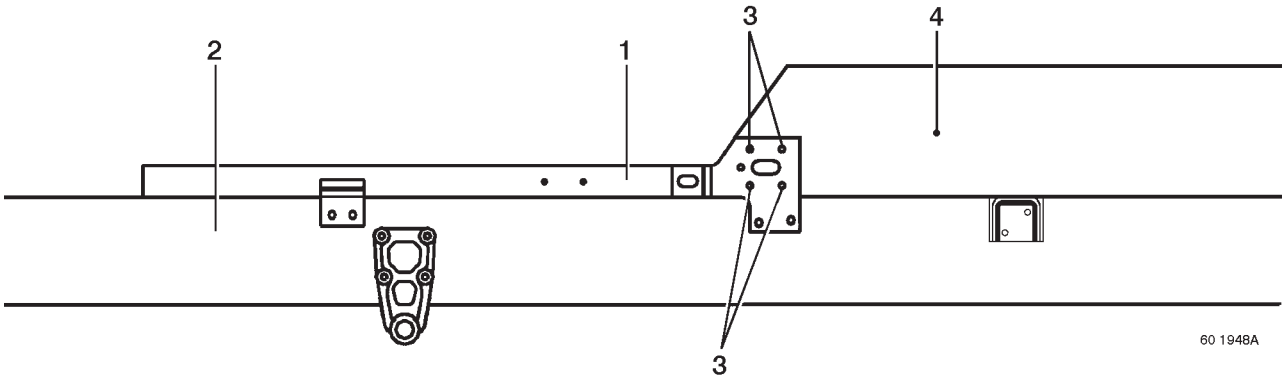
C - Rigid attachment
1 - Hexagon bolt M 14 x 600, class 10.9
2 - 2 plain washers 14 x 30 x 5
3 - Nut DRH M 14 class 10 or other locknut except nut with nylon ring (e.g. Nyloc)
a - Clearance: 1 to 2 mm before tightening
Tightening torque: 170 Nm

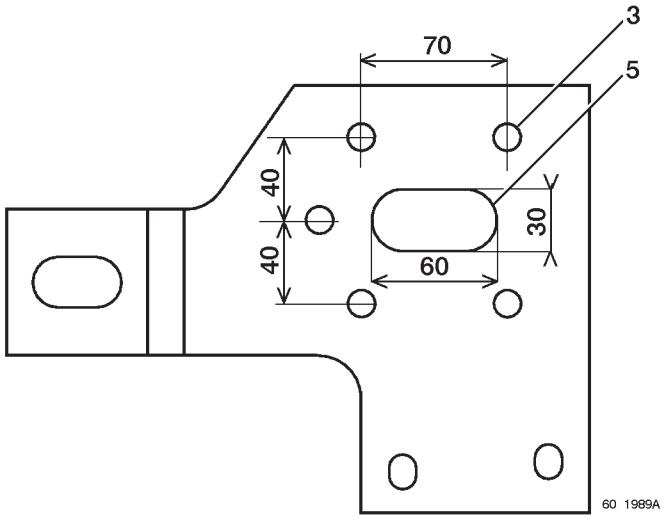


Bodywork attachment kit
The bodywork attachment kit is supplied with level 1 and level 2 electrical pre-arrangements (see chapters B-4 and B-5).

3.8.3 Special features of vehicles with 4-door cab

Vehicles equipped with the 4-door cab are fitted with a reinforcement (1) bolted to the chassis (2) under the cab. This reinforcement must be screwed to the front end of the sub-frame (4) using drillings (3) or plug welded using slotted hole (**5**).





Use M12 class 10.9 bolts with locknuts.

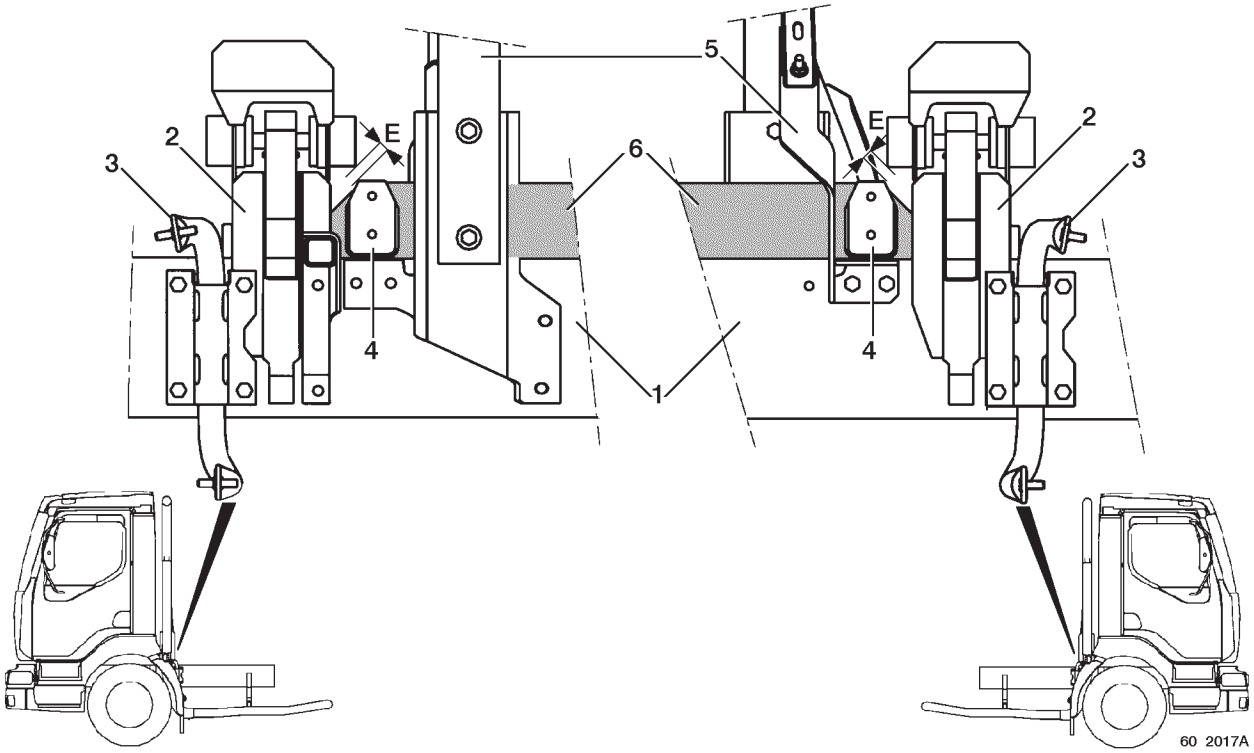
IMPORTANT
Reinforcements (1) can in no way substitute for sub-frame lateral guide stops. The assembly of guides is still vital for vehicles with 4-door cabs.

3.8.4 Special features of vehicles with sleeper cab and vertical exhaust

The vertical exhaust support brackets prevent passage of the sub-frame if the sub-frame brackets are welded on top. It is therefore important to:
- fasten the first bracket to the sub-frame by bolting.
- ban any welding on the sub-frame subsequent to its assembly on-vehicle.

Watch out to leave sufficient clearance (**E**) between the cab suspension and the first sub-frame bracket.
If necessary, notch it.
The width of this bracket should not exceed 90 mm.

1 - chassis
2 - cab rear support bracket
3 - wheelarch support
4 - first sub-frame bracket
5 - vertical exhaust support bracket
6 - sub-frame

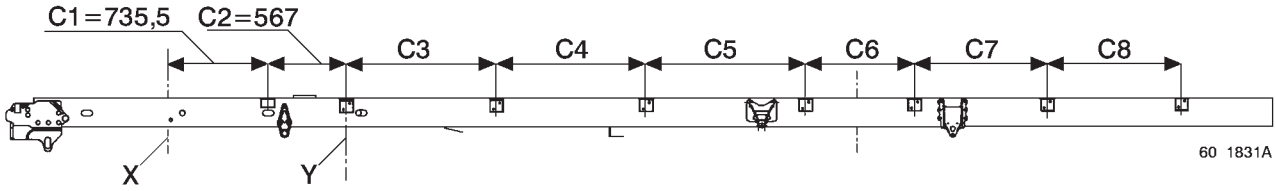


IMPORTANT
To prevent exhaust gases from dirtying the cab, the vertical exhaust pipe nozzle is adjustable over a height of 250 mm.

3.9 Longitudinal positioning of brackets on chassis

3.9.1 MIDLUM B 2-door day & sleeper cabs

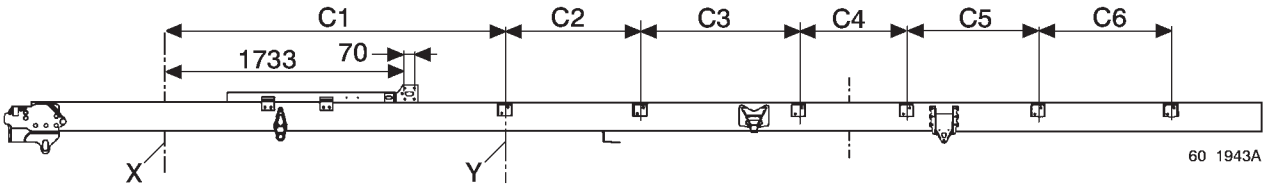
E - wheelbases
X - axle centre-line
Y - first bracket centre-line



Vehicle	E	C3	C4	C5	C6	C7	C8
Mechanical suspension	2700	1020	800	640			
	2950	1270		725			
	3250	930	640	800	850		
	3850	1000	1170		1100		
	4450	800	900	1070	800	805	840
	5050	1100		1170		970	980
Air suspension	3850	1000	780	1280	1010		
	4450	800	900	680	1280	715	840
	5050	1100		780		880	980

3.9.2 MIDLUM B 4-door cab

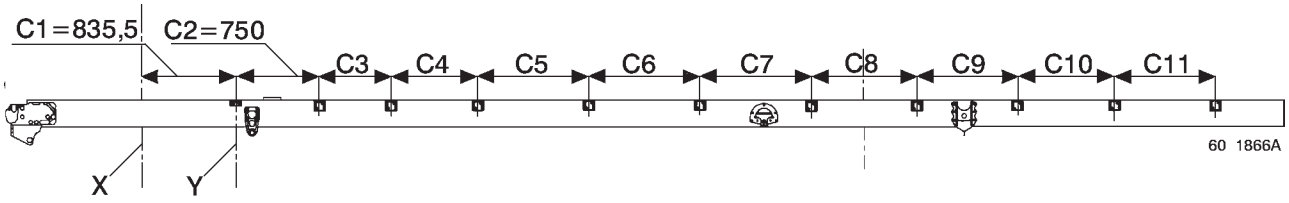
E - wheelbases
X - axle centre-line
Y - first bracket centre-line



Vehicle	E	C1	C2	C3	C4	C5	C6
Mechanical suspension	3250	2157	715	800	850		
	3850	2402	1070		1100		
	4450	2152	850	1070	800	805	840
	5050	2502	1000	1170		970	980

3.9.3 MIDLUM C'/C 2-door day & sleeper cabs

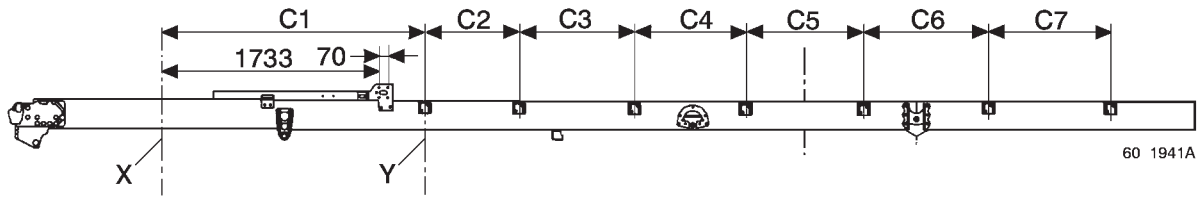
E - wheelbases
X - axle centre-line
Y - first bracket centre-line



Vehicle	E	C3	C4	C5	C6	C7	C8	C9	C10	C11
Mechanical suspension	3070	1012	950	692						
	3350	640	650	950	917					
	3650		950		962					
	3950	910	980							
	4550	640	830	1020	950	782	810			
	5150		630	830	990	950	1000	997		
	5750		900	1100	1050		1100	1100		
	6480		780	1000			950	900	872	900
Air suspension	3650	640	670	1250	942					
	3950	910	700							
	4550	640	830	740	1250	762	810			
	5150		630	830	710	1250	980	997		
	5750		900	1100	770		1080	1077		
	6480		780	1000		720	1250	880	872	900

3.9.4 MIDLUM C'/C 4-door cab

E - wheelbases
X - axle centre-line
Y - first bracket centre-line

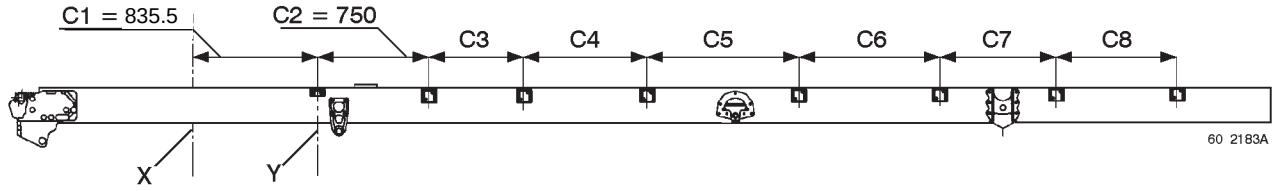


Vehicle C'	E	C1	C2	C3	C4	C5	C6	C7
Mechanical suspension	3350	2151	724	950				
	3650	2322	853					
	3950	2362	419	694	950	977		
	4550	2702	709	664		797	810	
	5150	2360	495	945	875	950	1000	997

Vehicle C	E	C1	C2	C3	C4	C5	C6	C7
Mechanical suspension	3350	2107	768	950				
	3650	2309	866		778			
	3950		546	620	950	957		
	4550	2107	948	1020		782	802	
	5150		748	930	890	950	1000	977

3.9.5 MIDLUM HD / Construction 2-door day & sleeper cabs

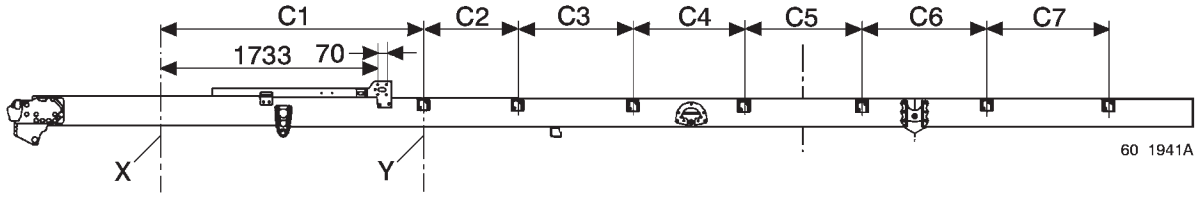
E - wheelbases
X - axle centre-line
Y - first bracket centre-line



Vehicle	E	C3	C4	C5	C6	C7	C8
Mechanical suspension	3070	1012	950	692			
	3350	640	650	950	917		
	3650		950		962		
	3950	910	980				
	4550	640	830	1020	950	782	810

3.9.6 MIDLUM HD / Construction 4-door cab

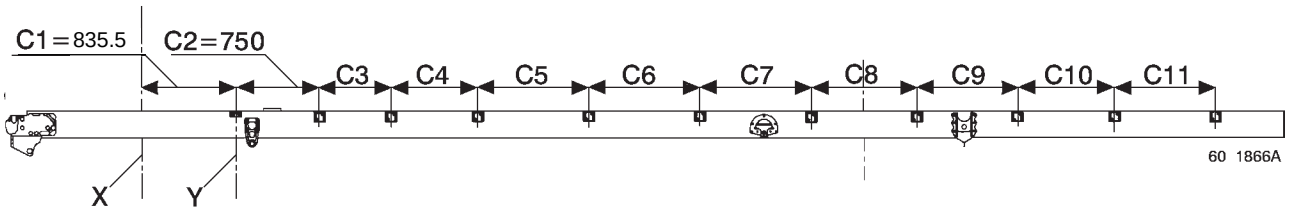
E - wheelbases
X - axle centre-line
Y - first bracket centre-line



Vehicle	E	C1	C2	C3	C4	C5	C6	C7
Mechanical suspension	3350	2107	768	950				
	3650	2309	866		778			
Air suspension	3950		546	620	950	957		
	4550	2107	948	1020		782	802	

3.9.7 MIDLUM D 2-door day & sleeper cabs

E - wheelbases
X - axle centre-line
Y - first bracket centre-line

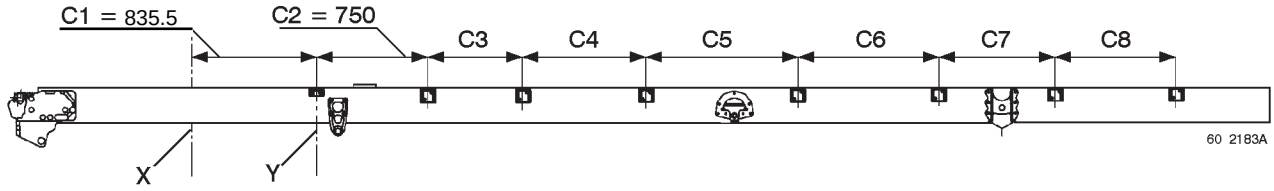


Vehicle	E	C3	C4	C5	C6	C7	C8	C9	C10	C11
Mechanical suspension	3650	640	950	950						
	3950	910	980							
	4250	640	950	600	950	800				
	4550		730	1120		782				
	4850		750		650	950	800			
	5150		630	830	990		1000			
	5750			990	1130		950			
	6050		900	1100	1050		1100			
	6480				700	650	950	1100		
	6780		780	1000				900	872	
Air suspension	3650	960	1050	700						
	3950	1200	1110							
	4250	900	660	1050	700	635				
	4550	640	1170	1100						
	4850		750	770	1050	700	635			
	5150		640	1180			820			
	5750			740	740	1050	700	815		
	6050		900	1030	600	940		952		
	6480			1100	720	1050		940		
	6780		780	1160		1100		770	900	

3.9.8 MIDLUM 4x4 2-door cab

MIDLUM 4x4 TA (all-wheel grip) vehicles are equipped with body brackets.
MIDLUM 4x4 TC (unkept tracks) vehicles are without body brackets (fixing holes available)

E - wheelbases
X - axle centre-line
Y - first bracket centre-line

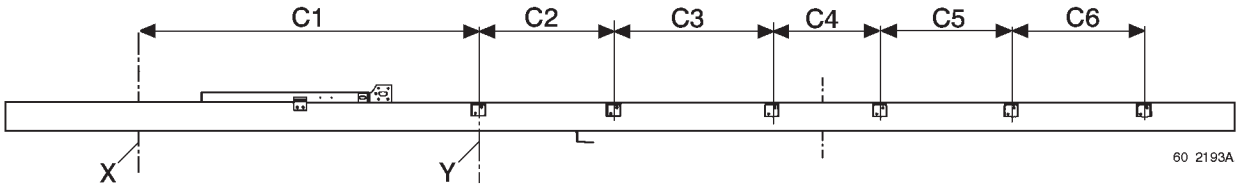


Vehicle	E	C3	C4	C5	C6	C7	C8
Mechanical suspension	3070	1012	950	692			
	3350	640	650	950	917		
	3650	730	860		962		
	3950	910	980				
	4550	727	830	933	950	782	810

3.9.9 MIDLUM 4x4 4-door cab

MIDLUM 4x4 TA (all-wheel grip) vehicles are equipped with body brackets.
MIDLUM 4x4 TC (unkept tracks) vehicles are without body brackets (fixing holes available)

E - wheelbases
X - axle centre-line
Y - first bracket centre-line



Vehicle	E	C1	C2	C3	C4	C5	C6
Mechanical suspension	3350	2062,5	813	950			
	3650	2252,5	923		778		
	3950		603	620	950	957	
	4550	2312,5	875	888		782	802

3.10 Changing the position of lateral flashing direction indicators

When installing a body on a vehicle equipped with a day cab with under-floor air intake and a body situated at a height lower than 140 mm in relation to the sidemembers, the position of flashing direction indicator lamps must be moved to prevent them from entering into contact with the body.

They can be fastened on the front end or on the sidewalls of the body.

Assembly on body front end

The lamps must be positioned according to the overall width of the bodywork in accordance with the regulations in force.

Install sealed crimping nuts compatible with the body material on the front end of the bodywork.

Make spacers allowing flat support of the lamp brackets and a sufficient spacing (e) between the body and the side lamp rim.

For bodies fitted with side doors, check that the door does not enter into contact with the lamps while it is being opened.

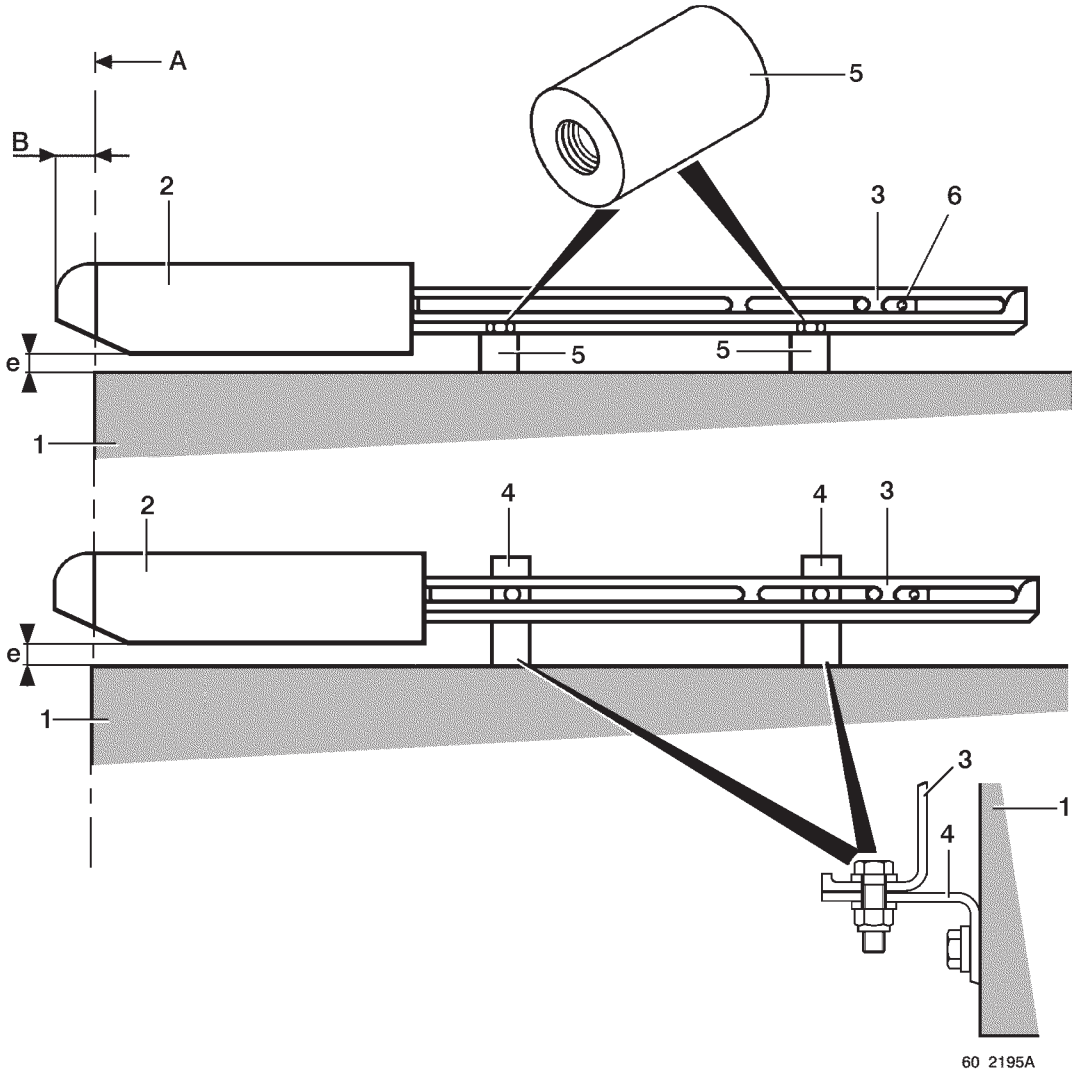
The lateral lamp brackets can also be carried by angle-brackets. This assembly makes it possible to adjust the lateral position of the lamps.

So that the position of lateral flashing direction indicators complies with EEC regulations, their height must not exceed 1500 mm and they must not be arranged at a distance of more than 1800 mm away from the front of the vehicle.

Depending on the overall width of the equipment, it may be necessary to change the position of the lateral direction indicator lamps (2). Comply with the regulations in force. Oblong holes made in the lamp brackets (3) serve for this modification.

The overall position (B) of the lateral direction indicator lamp in relation to the lateral dimensions (A) of the body (1) must be complied with.

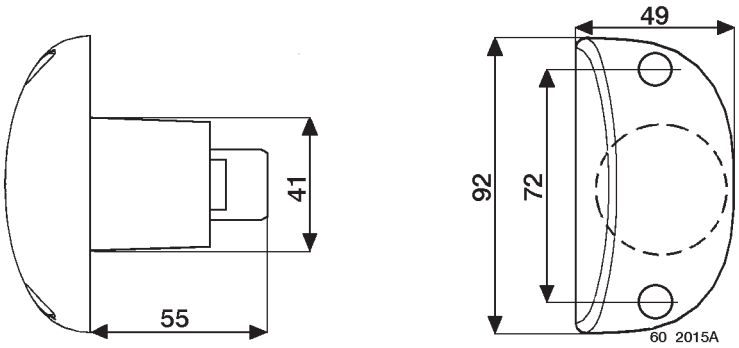
e > 10 mm

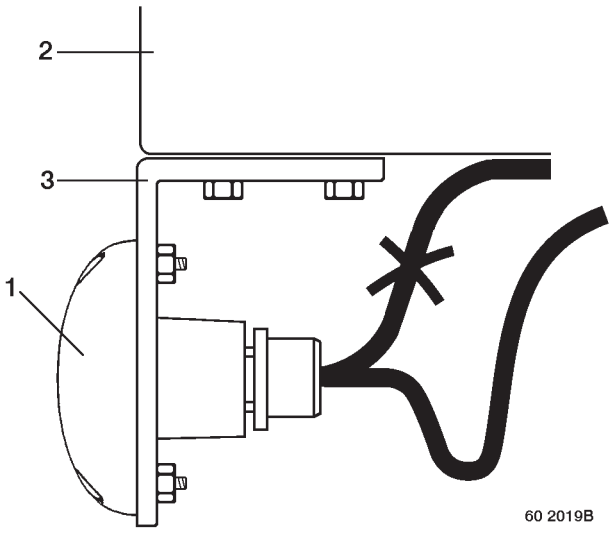


Assembly on body sidewalls

The lateral lamps (1) can be either carried on angle-brackets (3) or fastened directly to the edge of the body (2). The latter assembly nevertheless requires a housing to be contrived to allow passage of the connector through the partition.

So that the position of lateral flashing direction indicators complies with EEC regulations, their height must not exceed 1500 mm and they must not be arranged at a distance of more than 1800 mm away from the front of the vehicle.





ELECTRICAL PRE-ARRANGEMENTS
LEVEL 1

COMMERCIAL VARIANT 15502
Supplied with the “Tail lift” installation pre-arrangement

Available as option on vehicles

4. LEVEL 1 ELECTRICAL PRE-ARRANGEMENTS

4.1 Available power supplies

The basic vehicle is available without electrical pre-arrangement, but as option it can be equipped with level 1 or level 2 electrical pre-arrangements.
Trade vehicles (tankers, buildings and public works) are equipped with level 2 electrical pre-arrangement as standard.
The bodybuilder pre-arrangements as option include the level 1 or level 2 electrical pre-arrangement.
Refuse collector vehicles and light fire tenders are equipped with special electrical pre-arrangements.

The electrical pre-arrangements are necessary to obtain certain functions (e.g. chassis-mounted fast idling control) and contribute towards improvement assembly quality for optimized cost price.

These optional assemblies cannot be installed as aftermarket and must be ordered when purchasing the new vehicle.

4.2 Level 1 electrical pre-arrangements

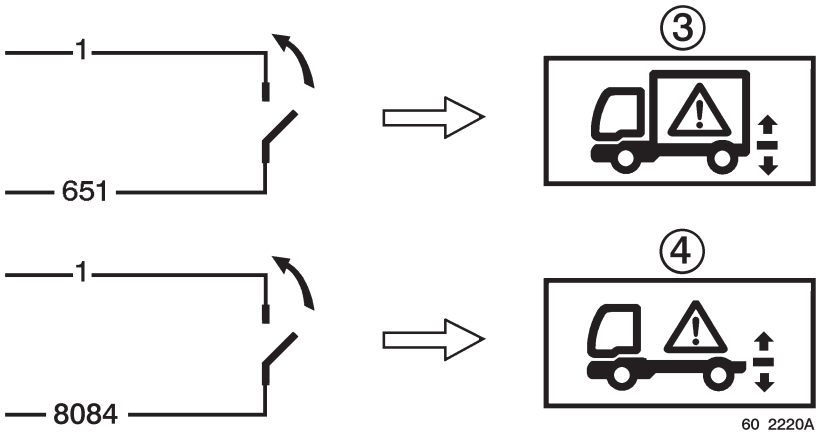
This option serves for the following, without modification to the vehicle wiring harnesses:
- power supply, control and monitoring of equipment (van, tail lift lighting),
- monitoring of equipment (tail lift),
- easy fitting of body lateral signalling.

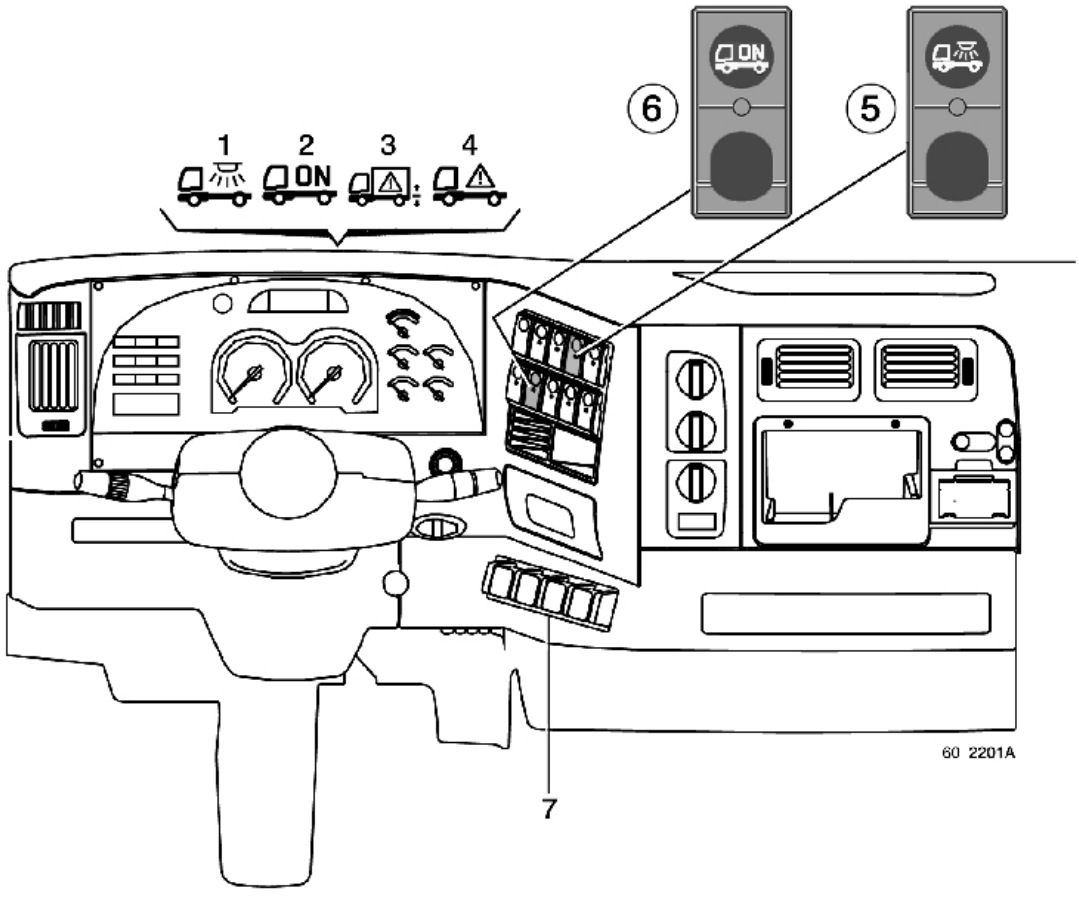
A specific wiring harness routes the power supplies and information from the warning lights and switches located in the cab as far as the battery compartment.
A lateral signalling installation kit is supplied in the cab, not assembled with the new vehicle.
A bodywork fastening kit, comprising all the threaded hardware necessary for fitting the body is supplied in a box in the cab.

Make-up:

In the cab on the display

- Four pictograms integrated in the instrument panel are dedicated to the bodybuilder function:
  - pictogram (**1**): van interior lighting,
  - pictogram (**2**): equipment power supply, machine unlocking,
  - pictogram (**3**): tail lift in working position (coupled to stop light and triggering of buzzer if the road speed is above 5 km/h),
  - pictogram (**4**): chassis equipment alert (available to bodybuilder, coupled with stop light).
- Display of pictograms:
  - pictograms (**1**) & (**2**) are displayed when the corresponding switches (**5**) & (**6**) are actuated.
  - pictograms (**3**) & (**4**) are displayed when the corresponding wires are connected to earth:
  - pictogram (**3**): wire 651 on stand-by in battery compartment,
  - pictogram (**4**): wire 8084 on stand-by in battery compartment.


1
651
③
1
8084
④
60 2220A

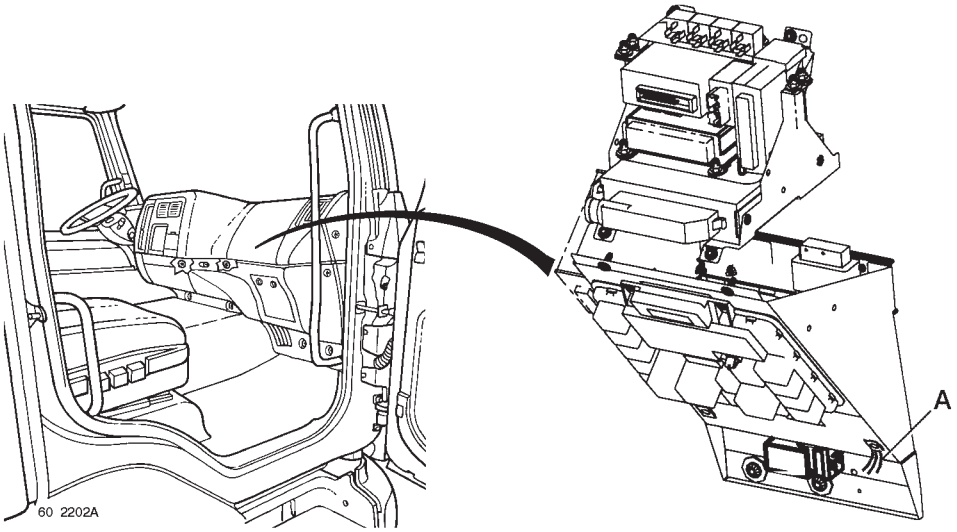

6
5
1
2
ON
3
4
7
60 2201A

Available power supplies in the cab under the connection unit

Three wires (**A**) on stand-by, equipped with 6.35 spade terminals deliver cab available power supplies:
- wire 208: after master switch “+” power supply
- wire 632: lighting, side lights “+” power supply
- wire 275: after ignition “+” power supply.

To make the earth, connect up to an earthing point on the inside of the cab (see chapter C-3.1).

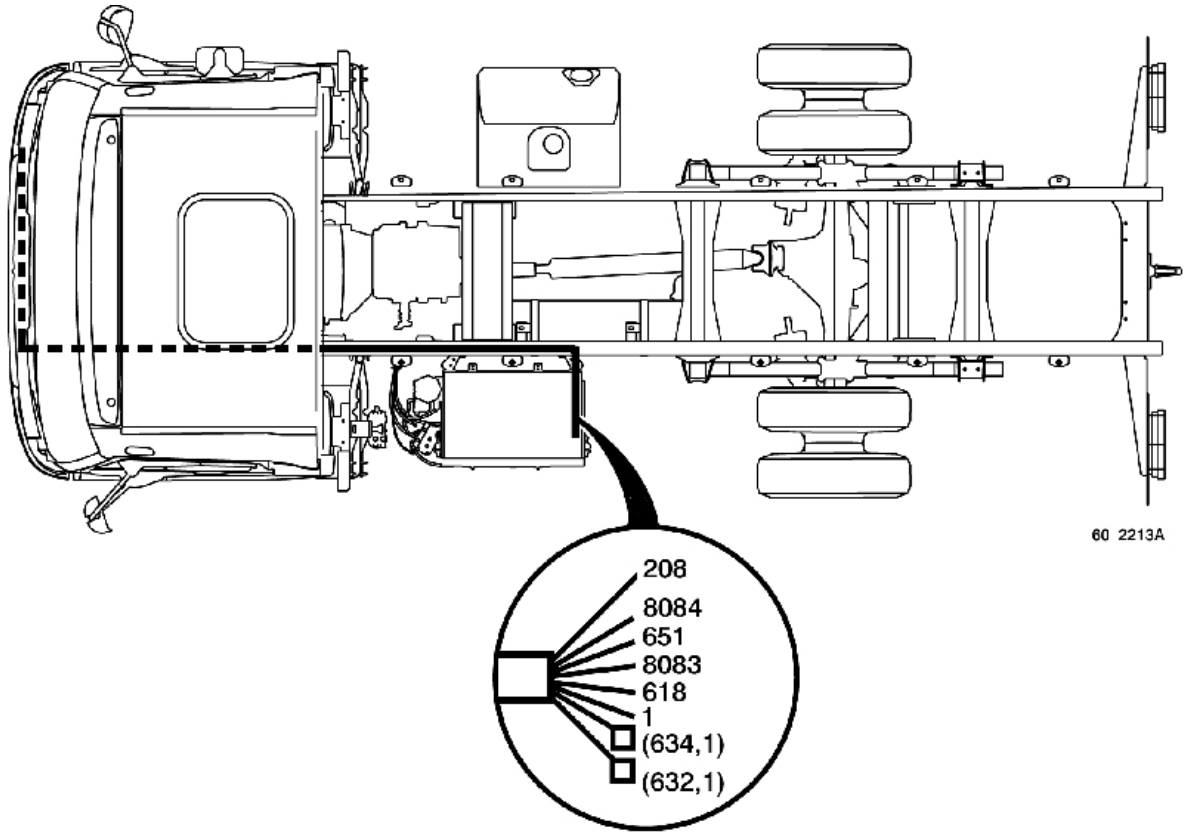
IMPORTANT
Wires N° 208 and 632, each supplied through one single fuse, deliver the available power supplies in parallel into the cab and to the front end. Consequently, the amperage crossing the supply fuse is equal to the sum of the amperages delivered by the two ends of each line. This amperage should not exceed 15 Amps.



In the battery compartment

- Power supplies available at the ends of the wiring harness on stand-by in the battery compartment:
  Two 2-way connectors: lateral lights power supply (earth: wire N° 1, “+” lighting: wire N° 632 on RH side and 634 on LH side).
  wire N° 208: after master switch “+” power supply
  wire N° 618: chassis lighting (10A) “+” power supply, controlled by chassis lighting switch
  wire N° 8083: equipment “+” power supply, controlled by machine unlocking switch
  wire N° 651 & 8084: display of pictograms (see preceding pages).

- High power “+” power supply available before master switch on 200 Amp fuse-holder for vehicles equipped with a “Tail lift” trade pack only.
  Spotface and stainless steel threaded hardware available in rear overhang for fastening the earth.



4.3 Assembly of lateral signalling installation kit

This optional kit is supplied in the cab, not assembled upon delivery of the new vehicle.
It serves for installing the lateral signalling feature of the equipment without having to convert the vehicle's electrical system.
Comply with the regulations in force for positioning the lateral lamps. The wiring harnesses for the lateral lamps must be fastened and protected against heat radiation (electric retarder and exhaust in particular).

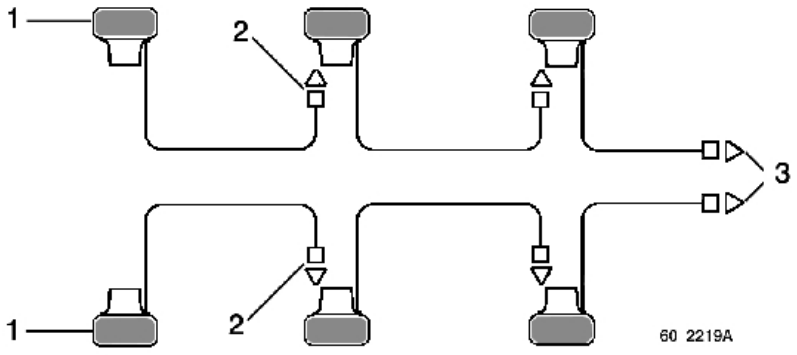
Make-up

6 to 8 lateral signalling lamps, comprising:
- one wiring harness 5 metres long complete with male connector,
- one female connector for interconnecting the lamps.

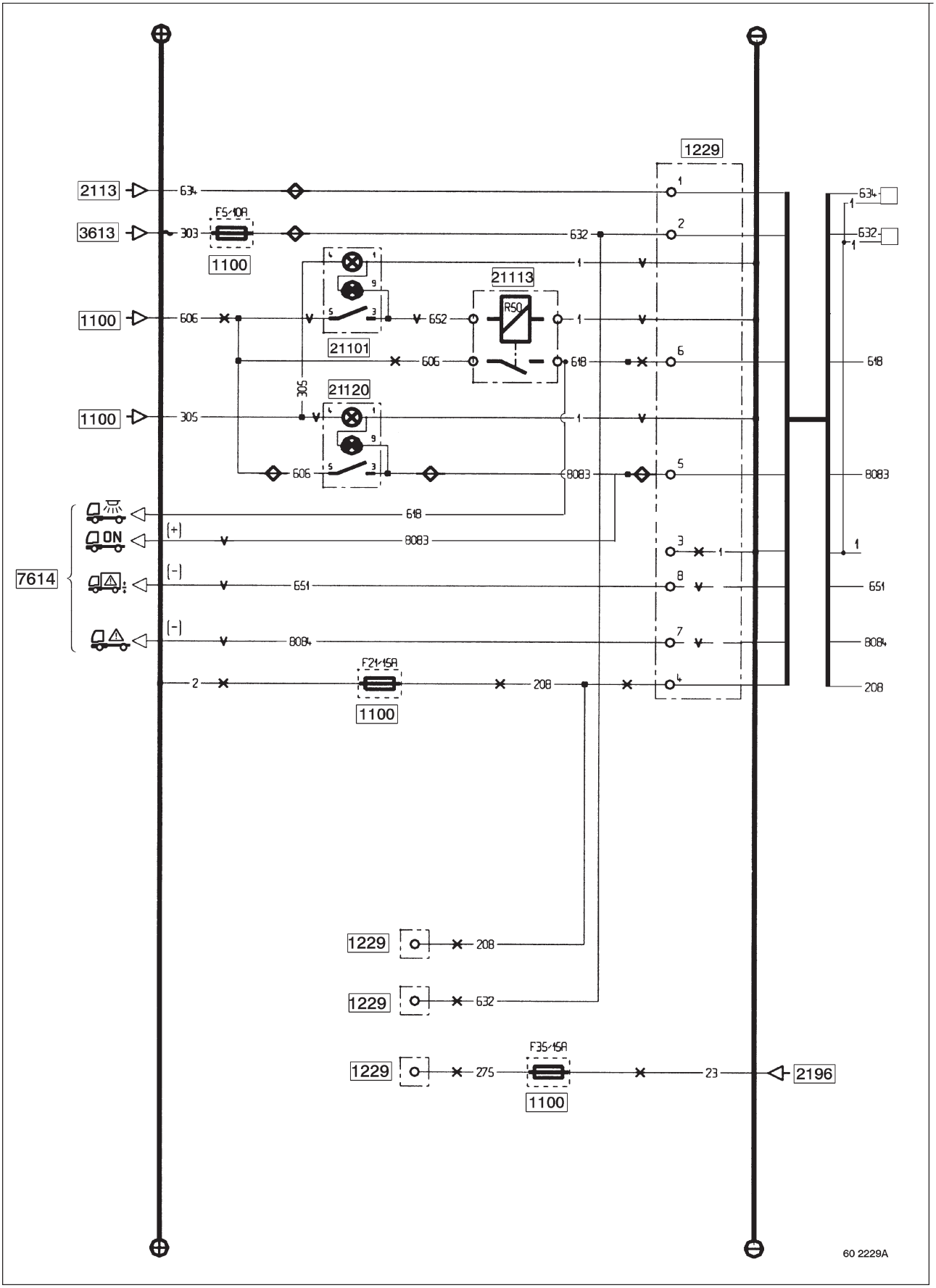
On-vehicle hook-up

The lamps are connected in series to one another, the first in the chain being connected to the vehicle.
The connection point on-vehicle is:
- 2-way connectors JPT of the available power supplies wiring harness in the battery compartment if the vehicle is thus equipped,
- rear lamps for vehicles equipped with rear lighting bar (by tapping),
- registration plate lamp on vehicles equipped with rear run-under guard (by by-pass).

1 - lateral signalling lamps
2 - connector to be plugged into the connector of the next lamp
3 - connector to be plugged into the vehicle (battery compartment, rear lamps or registration plate lamp).

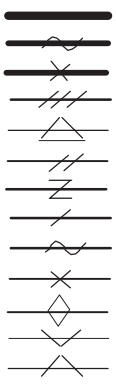


4.4 Electrical diagram for level 1 available power supplies



Key
1100 - Fuses
1229 - Chassis-cab connection unit
1335 - Bodybuilder available power supplies connector
2113 - Trailer socket, 7-pin type 24 N
2196 - After ignition “+” power supply (**R1**)
3613 - RH front side/parking lamp
7614 - Principal display
21101 - Bodybuilder equipment control
21113 - Bodybuilder equipment available power supply relay (**R50**)
21120 - Bodybuilder equipment control N° 2

Cable cross-section and colour



75 mm^2
60 mm^2
50 mm^2
25 mm^2
16 mm^2
10 mm^2 – Ivory
7 mm^2 – Pink
5 mm^2 – Ivory
3 mm^2 – Pink
2 mm^2 – Grey
1 mm^2 – Green
0,6 mm^2 – Grey
0,35 mm^2 – Orange

Assignment of fuses concerning electrical pre-arrangements

Fuse	Amperage	Wire N°	Function
F4	10	634	LH lateral lights power supply
F5	10	632	RH lateral lights power supply
F21	15	208	After master switch “+” power supply
F43	10	618	Power lighting power supply
		8083	Equipment power supply - Machine unlocking power supply
F35	105	202	After ignition “+” power supply

Do not exceed the max. currents of the switches; if you do, relay the power supply.

4.5 Bodywork fastening kit (located in cab and supplied with this pre-arrangement)

20 setbolts HM 14x150x60, class 10.9
2 setbolts HM 14x150x69, class 10.9
2 setbolts HM 14x150x110, class 10.9
48 plain washers 14x30x5
12 cone washers “Belleville” type
24 flanged locknuts DRH M14 class 10

ELECTRICAL PRE-ARRANGEMENTS
LEVEL 2

COMMERCIAL VARIANT 15503
Standard with
“Tanker” - “Buildings and Public Works” - “Road sweeper” vehicles

Supplied with the “Crane” installation pre-arrangement

Available as option on vehicles

5. LEVEL 2 ELECTRICAL PRE-ARRANGEMENTS

5.1 Available power supplies

The basic vehicle is available without electrical pre-arrangement, but as option it can be equipped with level 1 or level 2 electrical pre-arrangements.
Trade vehicles (tankers, buildings and public works) are equipped with level 2 electrical pre-arrangement as standard.
The bodybuilder pre-arrangements as option include the level 1 or level 2 electrical pre-arrangement.
Refuse collector vehicles and light fire tenders are equipped with special electrical pre-arrangements.

The electrical pre-arrangements are necessary to obtain certain functions (e.g. chassis-mounted fast idling control) and contribute towards improvement assembly quality for optimized cost price.

These optional assemblies cannot be installed as aftermarket and must be ordered when purchasing the new vehicle

5.2 Level 2 electrical pre-arrangements

This option serves for the following, without modification to the vehicle wiring harnesses:
- power supply, control and monitoring of equipment (chassis lighting),
- monitoring of equipment (tipper, crane, sideboards...),
- easy fitting of body lateral signalling.

Specific wiring harnesses route the power supplies and information from the warning lights and switches located in the cab as far as the battery compartment.

A lateral signalling installation kit is supplied in the cab, not assembled with the new vehicle.

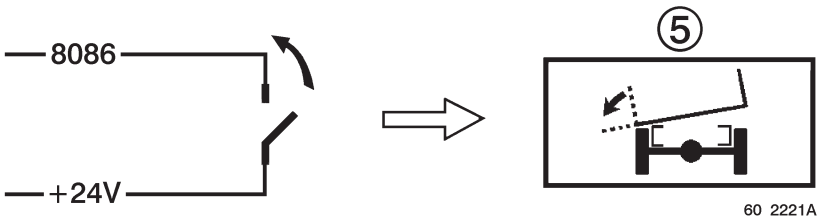
A bodywork fastening kit, comprising all the threaded hardware necessary for fitting the body is supplied in a box in the cab.

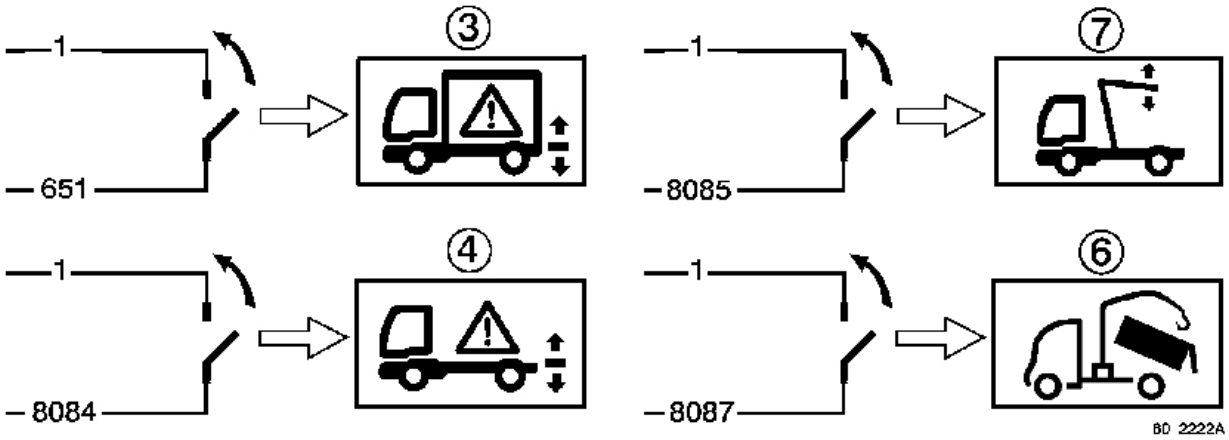
Make-up:

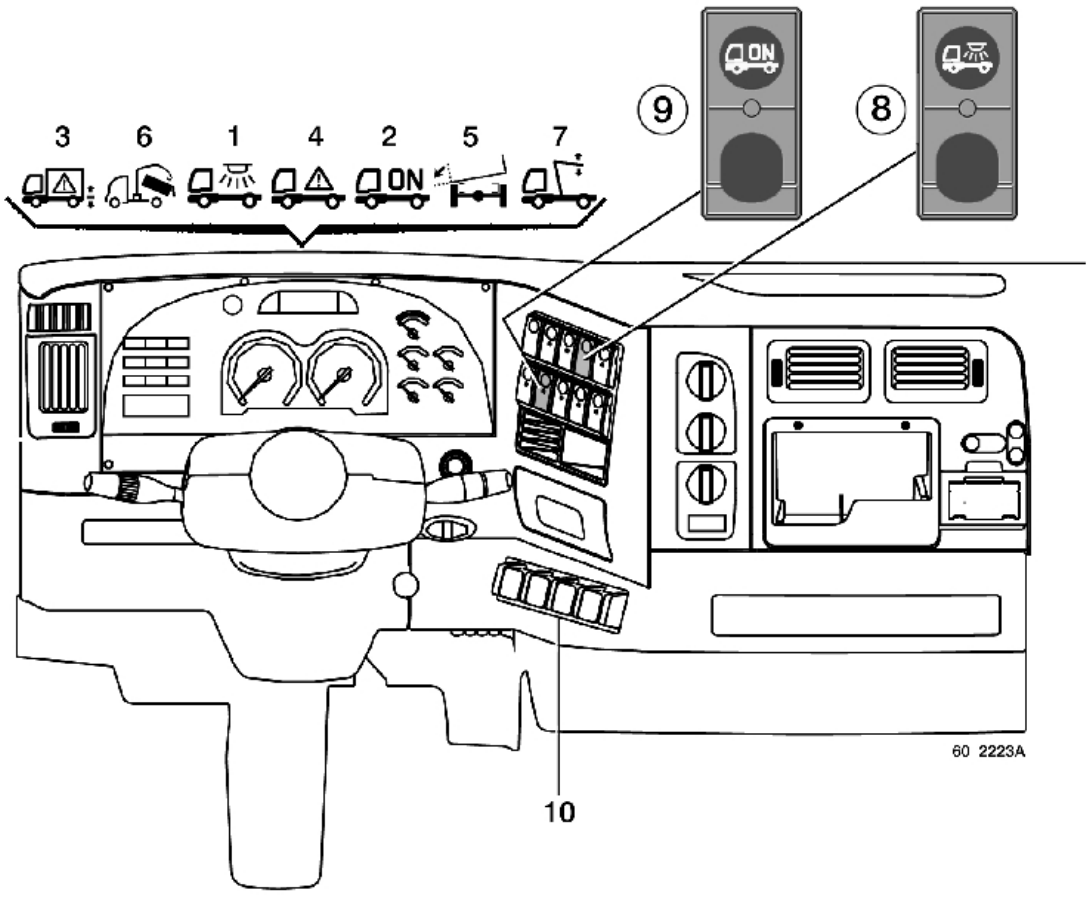
In the cab on the display

- Seven pictograms integrated in the instrument panel are dedicated to the bodybuilder function:
  - pictogram (**1**): van interior lighting,
  - pictogram (**2**): equipment power supply, machine unlocking,
  - pictogram (**3**): tail lift in working position (coupled to stop light and triggering of buzzer if the road speed is above 5 km/h),
  - pictogram (**4**): chassis equipment alert (available to bodybuilder, coupled with stop light),
  - pictogram (**5**): sideboard open(coupled to stop light and triggering of buzzer if the road speed is above 5 km/h),
  - pictogram (**6**): tipper raised (coupled to stop light and triggering of buzzer if the road speed is above 5 km/h),
  - pictogram (**7**): crane or cradle (coupled to stop light and triggering of buzzer if the road speed is above 5 km/h),

- Display of pictograms:
  - pictograms (**1**) & (**2**) are displayed when the corresponding switches (**8**) & (**9**) are actuated.
  - pictograms (**3**), (**4**), (**6**) & (**7**) are displayed when the corresponding wires are connected to earth:
  - pictogram (**3**): wire 651 on stand-by in battery compartment,
  - pictogram (**4**): wire 8084 on stand-by in battery compartment,
  - pictogram (**5**): is displayed when wire 8086 is connected to “+” 24V,
  - pictogram (**6**): wire 8087 on stand-by in RH sidemember,
  - pictogram (**7**): wire 8085 on stand-by in RH sidemember.


8086
+24V
⑤
60 2221A


1
651
③
1
8085
⑦
1
8084
④
1
8087
⑥
BD 2222A

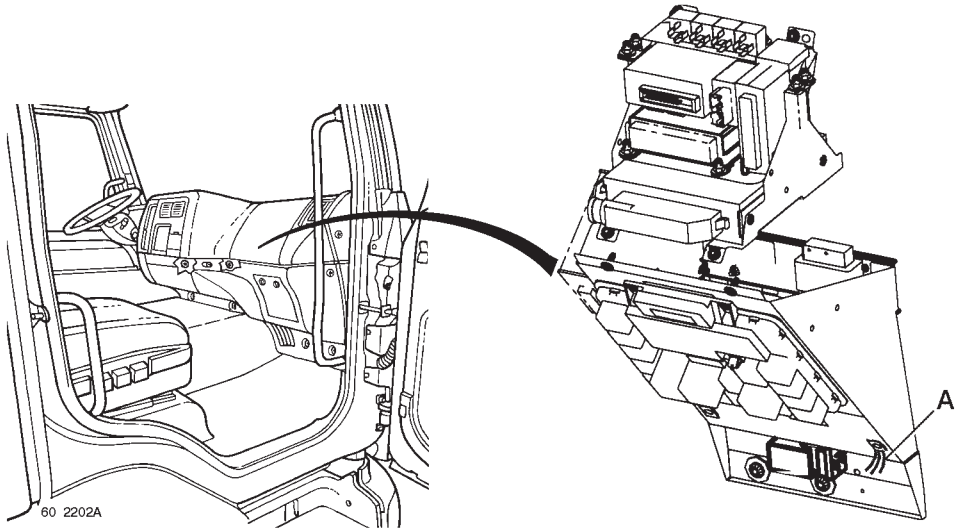

3 6 1 4 2 5 7
ON
⑨
⑧
10
60 2223A

Available power supplies in the cab under the connection unit

Three wires (**A**) on stand-by, equipped with 6.35 spade terminals deliver cab available power supplies:
- wire 208: after master switch “+” power supply
- wire 632: lighting, side lights “+” power supply
- wire 275: after ignition “+” power supply.

To make the earth, connect up to an earthing point on the inside of the cab (see chapter C-3.1).

IMPORTANT
Wires N° 208 and 632, each supplied through one single fuse, deliver the available power supplies in parallel into the cab and to the front end. Consequently, the amperage crossing the supply fuse is equal to the sum of the amperages delivered by the two ends of each line. This amperage should not exceed 15 Amps.



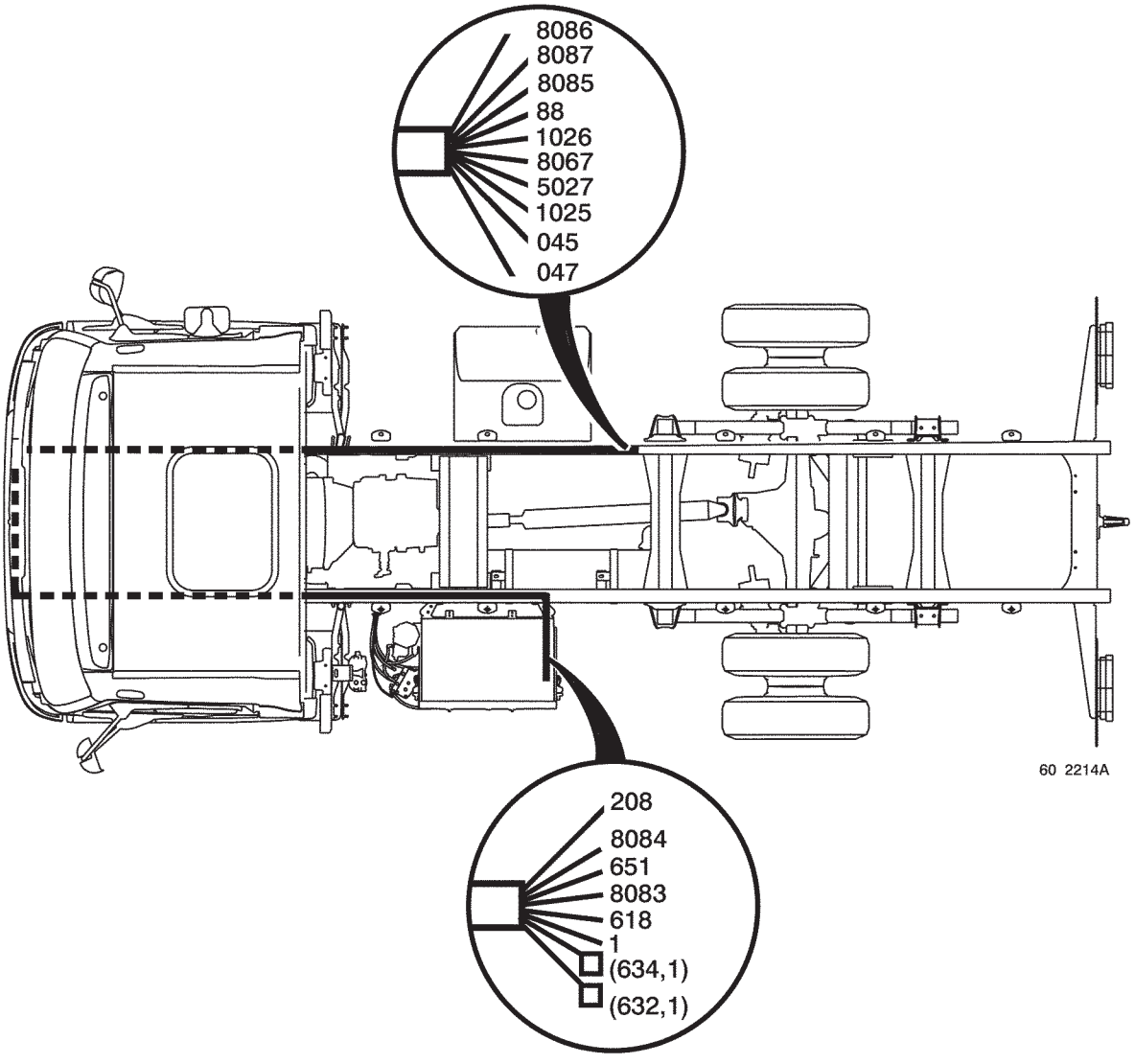
In the battery compartment

- power supplies available at the ends of the wiring harness on stand-by in the battery compartment:
  Two 2-way connectors: lateral lights power supply (earth: wire N° 1, “+” lighting: wire N° 632 on RH side and 634 on LH side).
  wire N° 208: after master switch “+” power supply
  wire N° 618: chassis lighting (10A) “+” power supply, controlled by chassis lighting switch
  wire N° 8083: equipment “+” power supply, controlled by machine unlocking switch
  wire N° 651 & 8084: display of pictograms (see preceding pages).

- high power “+” power supply available before master switch on 200 Amp fuse-holder for vehicles equipped with a “Tail lift” trade pack only.
  Spotface and stainless steel threaded hardware available in rear overhang for fastening the earth.

In the RH sidemember

Wire N° 8085: display of pictogram (**7**),
Wire N° 8086: display of pictogram (**5**),
Wire N° 8087: display of pictogram (**6**),
Wire N° 1025, 045, 047: chassis-mounted variable speed control,
Wire N° 88, 1026: PTO speed control,
Wire N° 5027: 30 km/h speed limitation control,
Wire N° 8067: fast idling speed control.

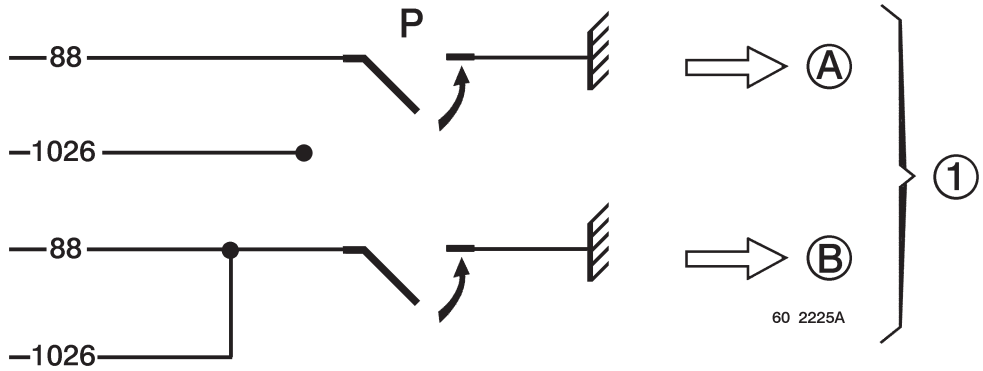


5.3 Management of engine speed

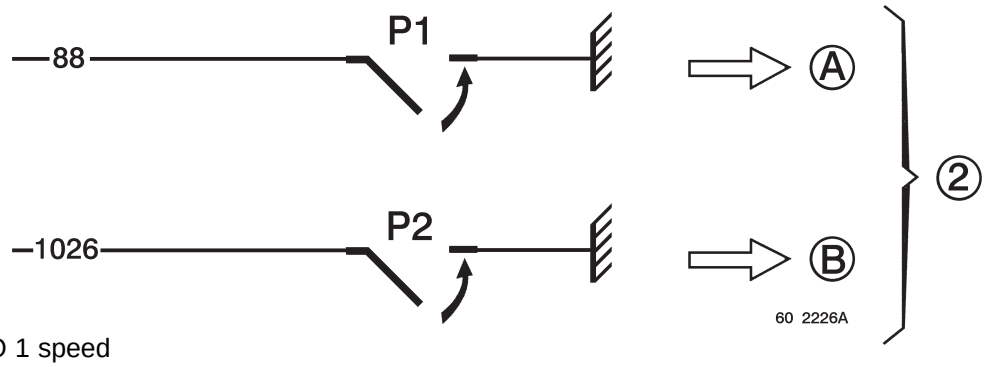
There are 3 ways of accessing the fast idling mode:
- by the steering wheel control,
- by earthing wire 8067 in the RH sidemember,
- by the variable speed control in the RH sidemember.

5.3.1 Choice of engine speed by default

When the vehicle is equipped with a power take-off, the procedure for engaging it is unchanged (see Driving handbook).
It is possible to choose between two pre-programmed speeds according to the vehicle use (see following table).
If wires 88 and 1026 are not connected, PTO speed 1 is activated.
If wires 88 and 1026 are connected, PTO speed 2 is activated.



If a second PTO is mounted, its engagement must connect wire 1026 to earth to access the corresponding idling speed (PTO 2).



A - PTO 1 speed
B - PTO 2 speed
P - PTO
P1 - PTO 1
P2 - PTO 2

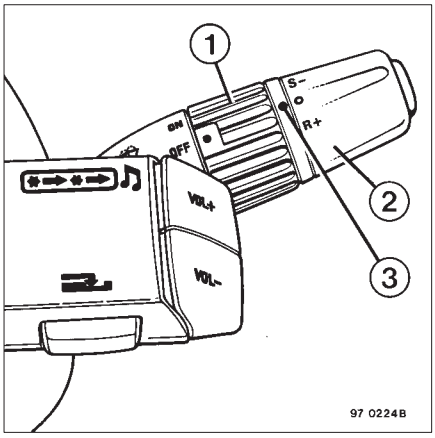
	PTO 1 rated speed (rpm)	PTO 2 rated speed (rpm)	PTO 1/PTO 2 speed limitation	PTO 1/PTO 2 speed limitation
Tanker	1100	950	1400	100%
Tipper				
Platform tower				
Crane				
Refuse collector			engine max.	
Road sweeper	1100	950	1400	

5.3.2 Use of the steering wheel fast idling control

Move the ring (**1**) to the “ON” position and turn the ring (**2**) to bring “R+” or “S-” opposite the mark (**3**), then release it.
Depress the accelerator pedal to bring the engine to the required engine speed and in this position, turn the ring (**2**) to bring to bring “S-” opposite the mark (**3**) so as to memorize the speed, then release the accelerator pedal.
To fine tune the engine speed:

- Turn ring (**2**) to bring “R+” opposite the mark (**3**) to increase the speed.
- Turn ring (**2**) to bring “S-” opposite the mark (**3**) to reduce the speed.

Any action on the brake pedal or any gearshifting or moving the ring (1) to the “OFF” position overrides the feature.



5.3.3 Vehicle fitted with a power take-off

When the PTO is in operation, the first action on the ring (**2**) (“S-” or “R+”) calls up the works set engine rotating speed (1100 or 950 rpm).

Rotating speed
In the event of hydraulic pump drive, do not exceed the rotating speed indicated by the equipment manufacturer.
The engine speed is limited to 1400 rpm by the works setting.
Depending on the equipment fitted by the equipment manufacturer, this engine speed can be modified by means of the RENAULT V.I. test tool.

IMPORTANT
Avoid actuating the accelerator pedal during the use of the fast idling feature.

5.3.4 Use of the chassis-mounted fast idling control

Earthing of wire 8067 permits access to the fast idling speed from the chassis.

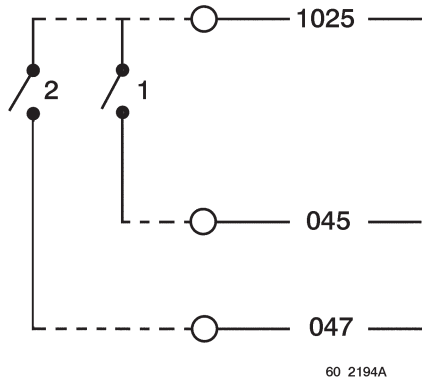
5.3.5 Use of the chassis-mounted fast idling variable speed control

Variable chassis-mounted speed control (example of connection)

- Install a monostable switch (1) between wires 1025 and 045.
- Install a monostable switch (2) between wires 1025 and 047.

When switch (**1**) is closed, the engine speed increases.

When switch (**2**) is closed, the engine speed decreases.



It is possible to install a 3-position monostable switch to avoid the two acceleration and deceleration controls at the same time.

Upon the first pulse on one of the two controls, the engine passes to the pre-programmed speed, then the engine speed is adjusted by means of the controls.

IMPORTANT

All the chassis-mounted controls are doubled up on the steering wheel controls.

5.4 Speed limitation

Earthing of wire 5027 limits the vehicle speed to 30 km/h. The parameter for this value can be defined in the dealership for special needs.
This function is accessible if the vehicle is travelling at a speed below 25 km/h. It is de-activated when the road speed is below 5 km/h.

IMPORTANT
Access to the regulated speeds (see chapters 5.3.2 to 5.3.5) is subject to the following conditions:
- engine running,
- PTO engaged,
- road speed below 15 k/h,
- parking brake applied,
- gear selector in neutral.
Any action or modification to the above-mentioned conditions will lead to exit from the regulated mode.

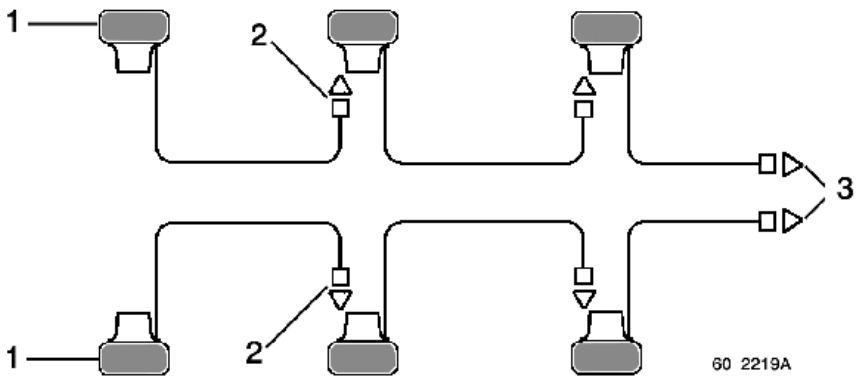
5.5 Assembly of lateral signalling installation kit

This optional kit is supplied in the cab, not assembled upon delivery of the new vehicle.
It serves for installing the lateral signalling feature of the equipment without having to convert the vehicle's electrical system.
Comply with the regulations in force for positioning the lateral lamps. The wiring harnesses for the lateral lamps must be fastened and protected against heat radiation (electric retarder and exhaust in particular).

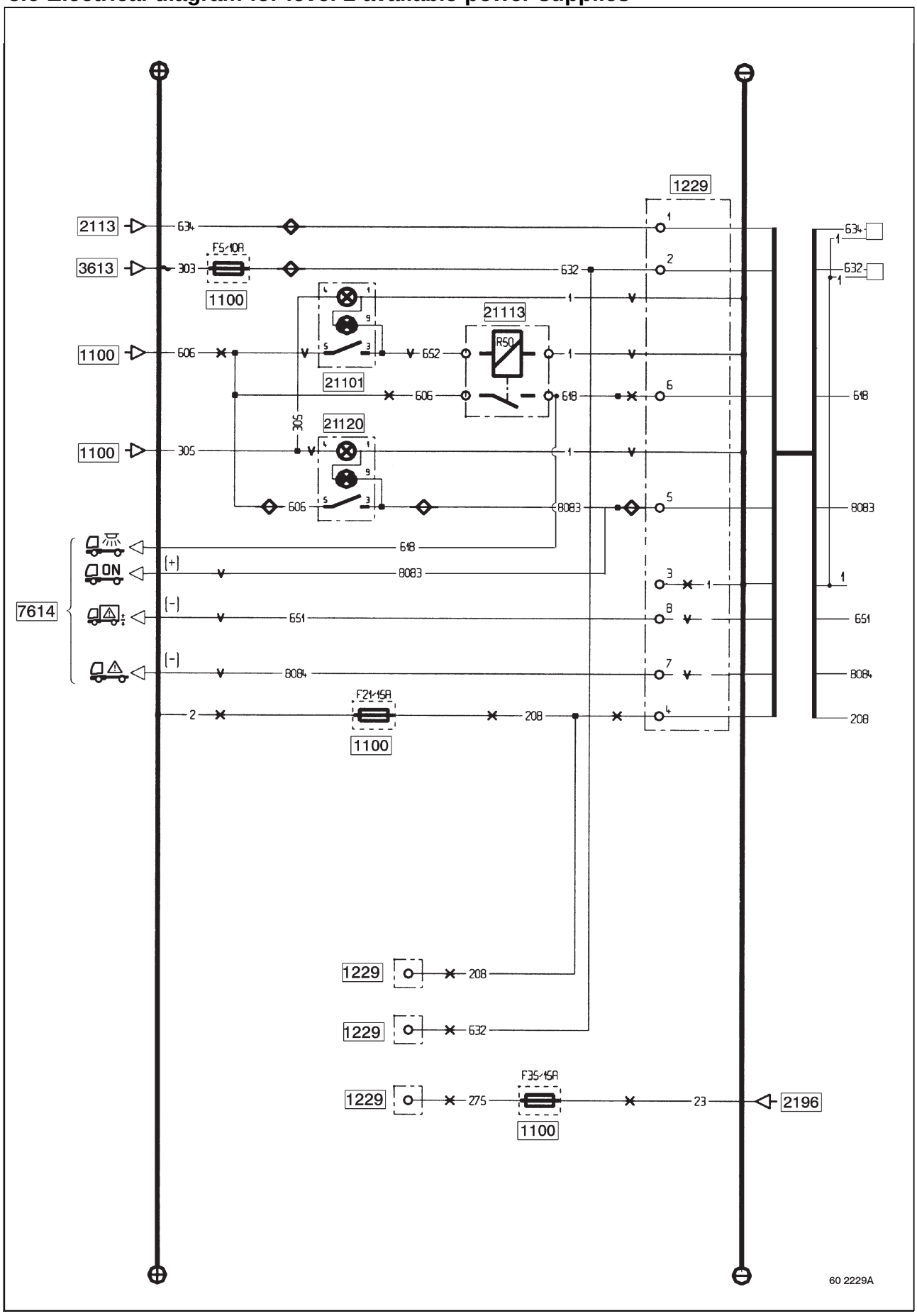
Make-up
6 to 8 lateral signalling lamps, comprising:
- one wiring harness 5 metres long complete with male connector,
- one female connector for interconnecting the lamps.

On-vehicle hook-up
The lamps are connected in series to one another, the first in the chain being connected to the vehicle.
The connection point on-vehicle is:
- 2-way connectors JPT of the available power supplies wiring harness in the battery compartment if the vehicle is thus equipped,
- rear lamps for vehicles equipped with rear lighting bar (by tapping),
- registration plate lamp on vehicles equipped with rear run-under guard (by by-pass).

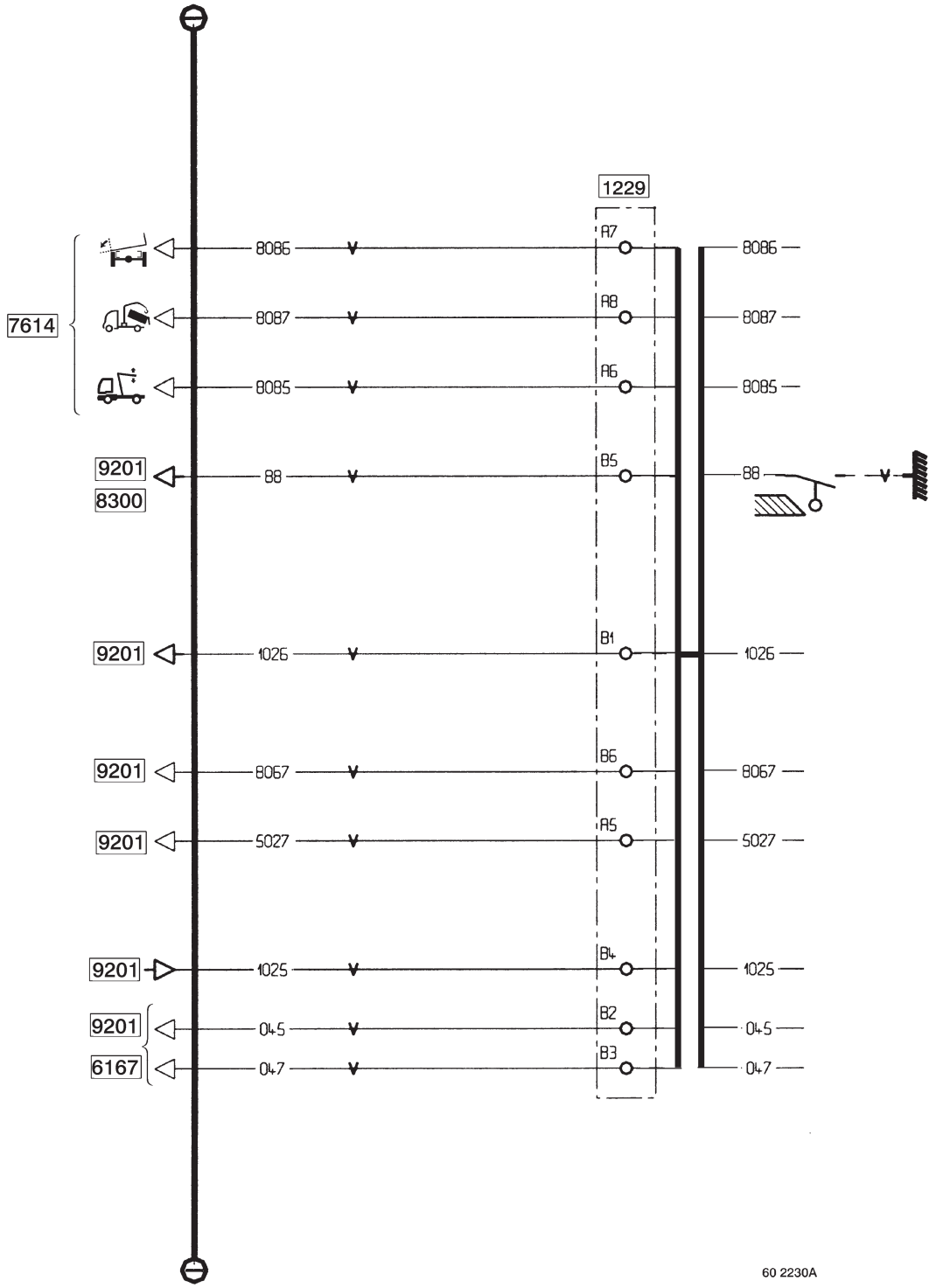
1 - lateral signalling lamps
2 - connector to be plugged into the connector of the next lamp
3 - connector to be plugged into the vehicle (battery compartment, rear lamps or registration plate lamp).



5.6 Electrical diagram for level 2 available power supplies

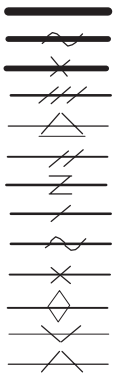


Electrical diagram for level 2 available power supplies



Key
1100 - Fuses
1229 - Chassis-cab connection unit
1335 - Bodybuilder available power supplies connector
2113 - Trailer socket, 7-pin type 24 N
2196 - After ignition “+” power supply (**R1**)
3613 - RH front side/parking lamp
7614 - Principal display
8300 - Power take-off
9201 - Vehicle electronic control unit (VECU)
21101 - Bodybuilder equipment control
21113 - Bodybuilder equipment available power supply relay (**R50**)
21120 - Bodybuilder equipment control N° 2

Cable cross-section and colour



75 mm^2
60 mm^2
50 mm^2
25 mm^2
16 mm^2
10 mm^2 – Ivory
7 mm^2 – Pink
5 mm^2 – Ivory
3 mm^2 – Pink
2 mm^2 – Grey
1 mm^2 – Green
0,6 mm^2 – Grey
0,35 mm^2 – Orange

Assignment of fuses concerning electrical pre-arrangements

Fuse	Amperage	Wire N°	Function
F4	10	634	LH lateral lights power supply
F5	10	632	RH lateral lights power supply
F21	15	208	After master switch “+” power supply
F43	10	618	Power lighting power supply
		8083	Equipment power supply - Machine unlocking power supply
F35	105	275	After ignition “+” power supply

Do not exceed the max. currents of the switches; if you do, relay the power supply.

5.7 Bodywork fastening kit (located in cab and supplied with this pre-arrangement)

20 setbolts HM 14x150x60, class 10.9
2 setbolts HM 14x150x69, class 10.9
2 setbolts HM 14x150x110, class 10.9
48 plain washers 14x30x5
12 cone washers “Belleville” type
24 flanged locknuts DRH M14 class 10

TAIL LIFT INSTALLATION PRE-ARRANGEMENT
COMMERCIAL VARIANT 20295

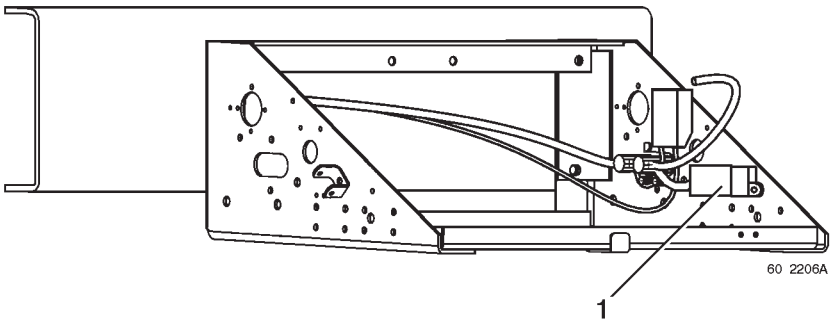
Available as option on all vehicles

6. VEHICLE EQUIPPED WITH A TAIL LIFT

“Tail lift” installation pre-arrangement
- level 1 bodybuilder electrical pre-arrangement for installation of a tail lift (see chapter B-4),
- reinforced rear suspension,
- without rear run-under guard (option for column type tail lifts),
- 80 Amp alternator,
- 170 Amp-hour batteries,
- 200 Amp fuse-holder located in battery compartment,
- tail lift earth available in the rear overhang,
- earth screw in rear overhang.

Options
- level 2 bodybuilder electrical pre-arrangement (see chapter B-5).

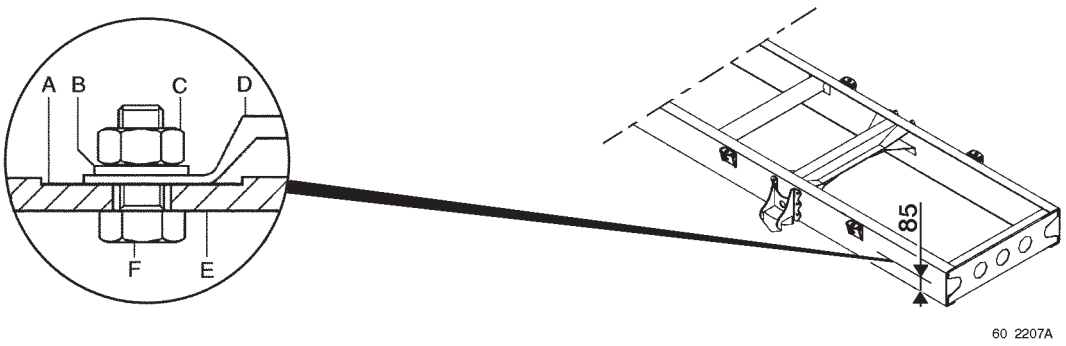
6.1 Fuse-holder 200 A



A high-power fuse-holder (**1**) is on stand-by in the battery compartment for supplying power to the tail lift.

6.2 Tail lift earth in rear overhang

A - Spotface diameter 30 mm
B - Plain washer diameter 10 mm, stainless steel
C - Nut H 10x150, stainless steel
D - Earth lug or braid
E - Sidemember
F - Bolt M10x150, stainless steel



“TANKER” VEHICLE

7. TANKER VEHICLE

- 16 tonnes GVW available in three wheelbases 3350, 3650, 3950 on MIDLUM C base,
- 15.7 tonnes GVW (single tyre fitment at rear) available in three wheelbases 3350, 3650, 3950 on MIDLUM C base,
- 18 tonnes GVW available in four wheelbases 3650, 3950, 4250, 4450 on MIDLUM D base.

Day cab only.

Tanker special features

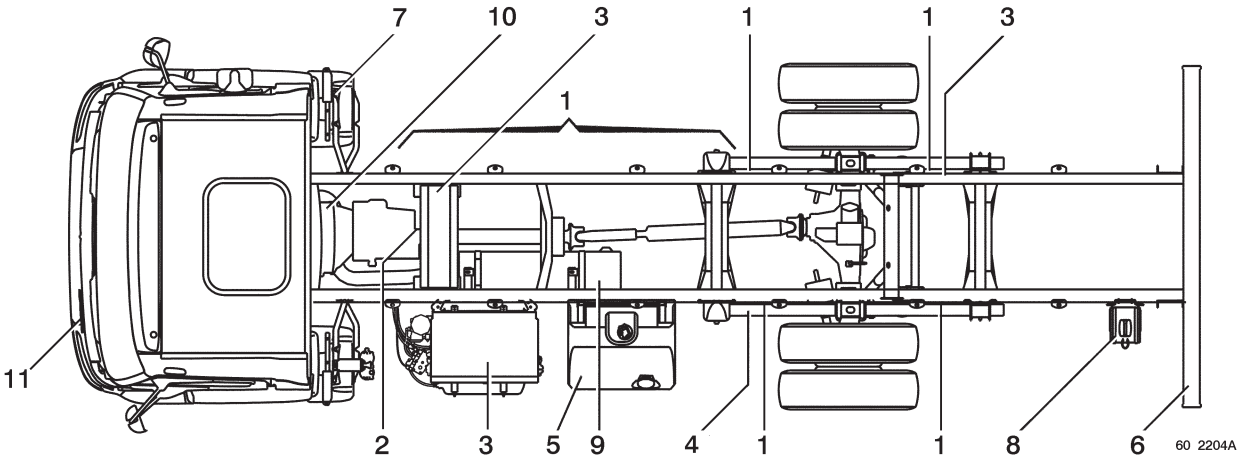
- RH sidemember (**1**) cleared, without lateral accessories for the installation of specific accessories,
- punchings on chassis for fastening accessories and wing brackets (**1**),
- gearbox-mounted PTO (**2**) type 2264 B with flange output, speed 950 or 100 rpm,
- adjustable fast idling,
- remote controlled clutch release operating ram,
- level 2 bodybuilder electrical pre-arrangement (see chapter B-5),
- reinforced front and rear parabolic leaf spring suspensions (**4**),
- tachograph,
- tanker lateral signalling installation kit,
- fuel tank on left side (**5**).

ADR equipment

- rear run-under guard for tanker overall width 2350 mm, (**6**)
- chassis-mounted “palm switch” stop control (**7**),
- 2 kg fire extinguisher in cab,
- portable orange wander lamps in cab,
- wheel chock (**8**),
- exhaust silencer shield (**9**),
- behind-cab shield (**10**),
- ABS,
- pre-arrangement for fixing ADR plate (**11**),
- battery isolation switch with pneumatic control.

Options

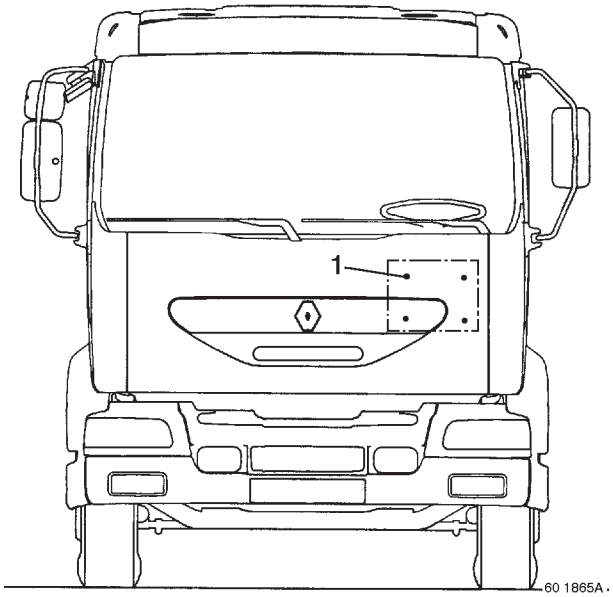
- spare wheel,
- gearbox-mounted PTO with splined shaft output,
- without “ADR” (“transport of dangerous materials”) equipment,
- towing crossmember capacity > 3.5 tonnes,
- engine hourmeter in cab.



7.1 ADR plate

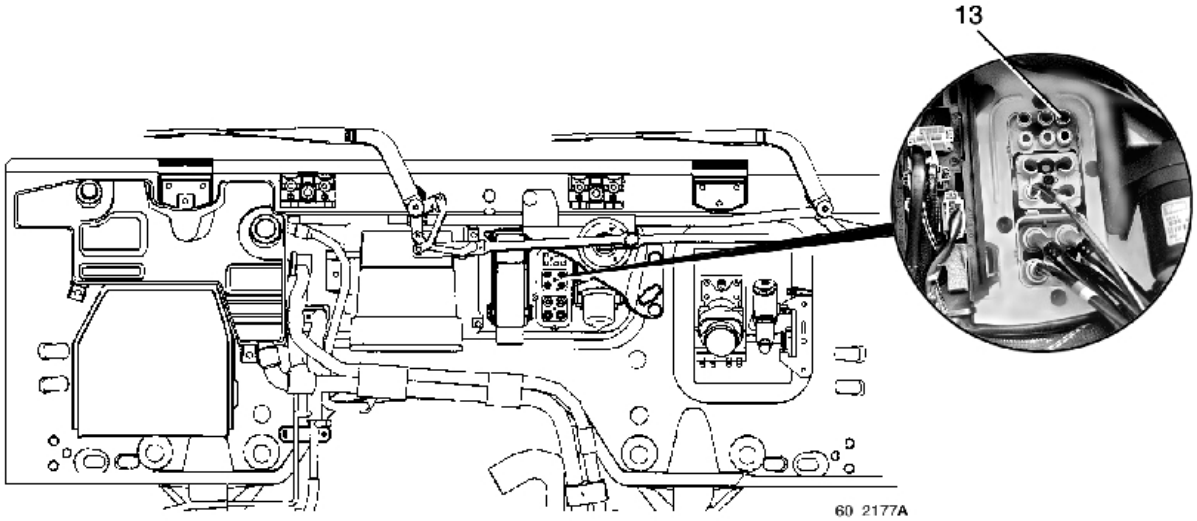
Punchings (**1**) made on the inner face of the front grille mark the position of the drilling points for fixing the ADR plate.

The plate bracket must be provided with a retaining system to keep the plate in its housing when the front grille is opened.



7.2 Remote controlled clutch release operating ram

A remote controlled single-acting clutch release operating ram is installed as option on the clutch pedal. It is pre-wired on the front end through port (**13**). Connect the compressed air supply to this port to actuate the ram.

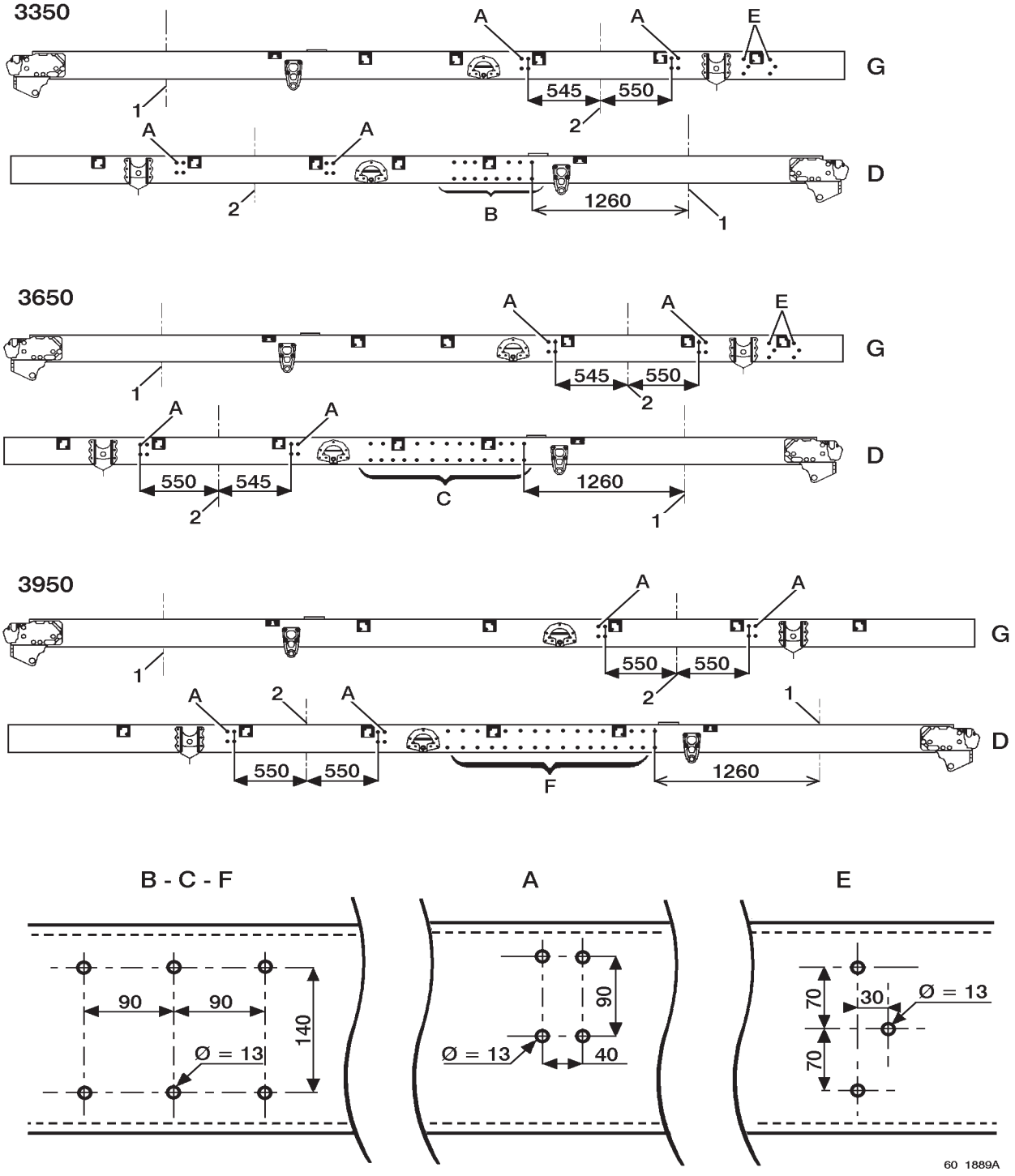


7.3 Assembly of chassis accessories

Drillings in the sidemembers serve for attaching equipment such as:
- wing brackets (stakes),
- fuel tank in the wheelbase or rear overhang, LH side,
- various equipment items (e.g. off-loading pump) in the wheelbase, RH side.

Punchings in the rear overhang serving for adjusting the position of the rear run-under guard are identical to those of the MIDLUM C having the same wheelbase (consult the “Changing the position of equipment” chapter).

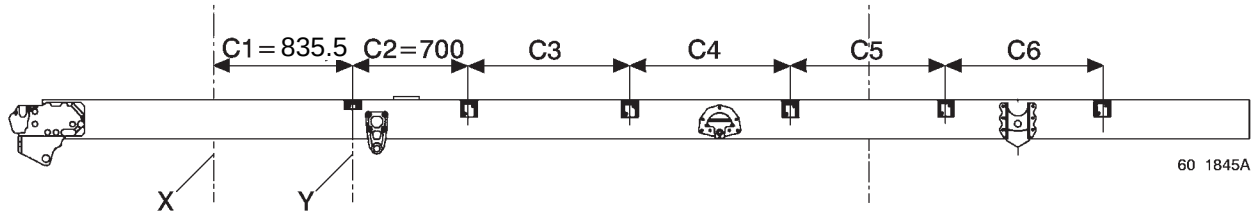
Key to diagram
1 - front axle centre-line
2 - rear drive axle centre-line
A - drillings for assembly of wing brackets
B - drillings for assembly of equipment: 23 drillings distributed over a length of 990 mm
C - drillings for assembly of equipment: 27 drillings distributed over a length of 1260 mm
D - RH sidemember
B - drillings for assembly of fuel tank in rear overhang
B - drillings for assembly of equipment: 34 drillings distributed over a length of 1620 mm
G - LH sidemember



7.4 Longitudinal positioning of brackets on chassis

7.4.1 MIDLUM C tanker

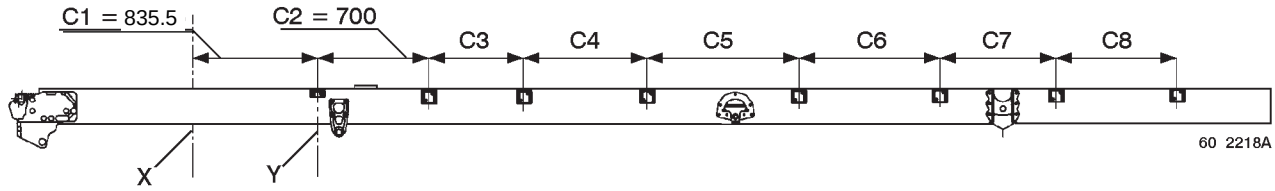
E - wheelbases
X - axle centre-line
Y - first bracket centre-line



E	C3	C4	C5	C6
3350	700	640	940	740
3650		940		
3950	970	970		970

7.4.2 MIDLUM D 18 tonnes tanker

E - wheelbases
X - axle centre-line
Y - first bracket centre-line

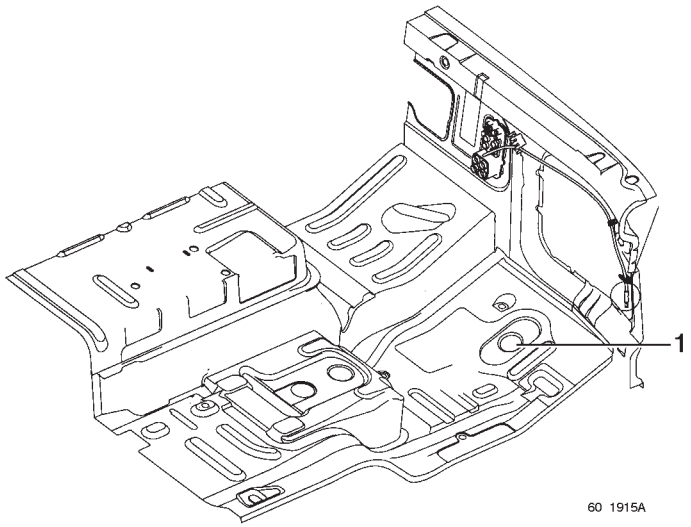


Vehicle	E	C3	C4	C5	C6	C7	C8
Mechanical suspension	3650	700	940	940			
	3950	970					
	4250	700	630	910	940	727	
	4550		925	915		860	
Air suspension	3650	970	1165	875			
	3950	790	660	735	875		
	4250		960			547	
	4550	700	673	677	735	875	680

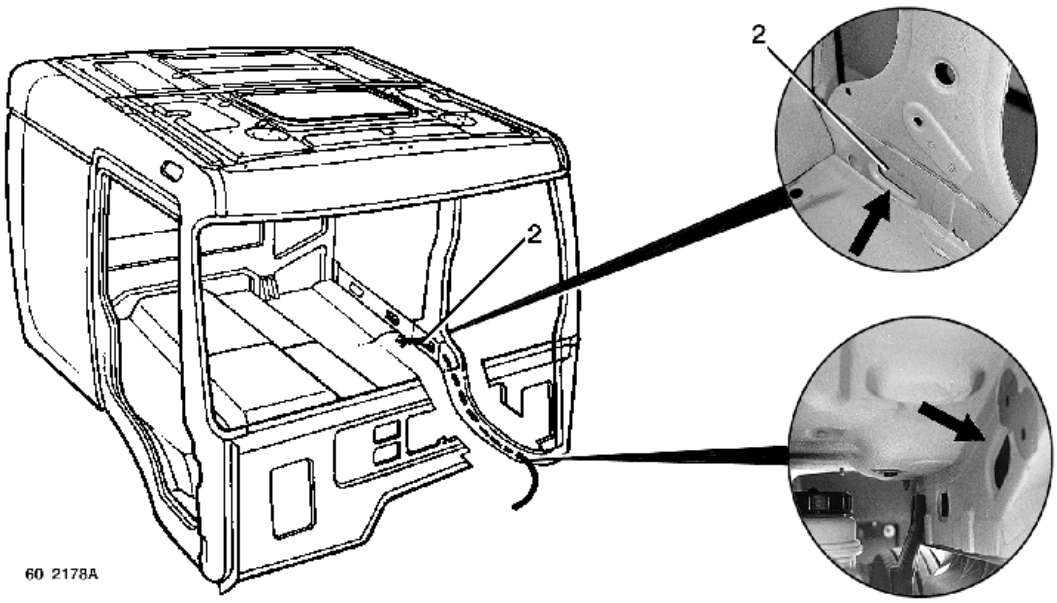
7.5 Passage of wiring harnesses and compressed air pipes through cab

Three passages are possible for routing the wiring harnesses from the inside to the outside of the cab:

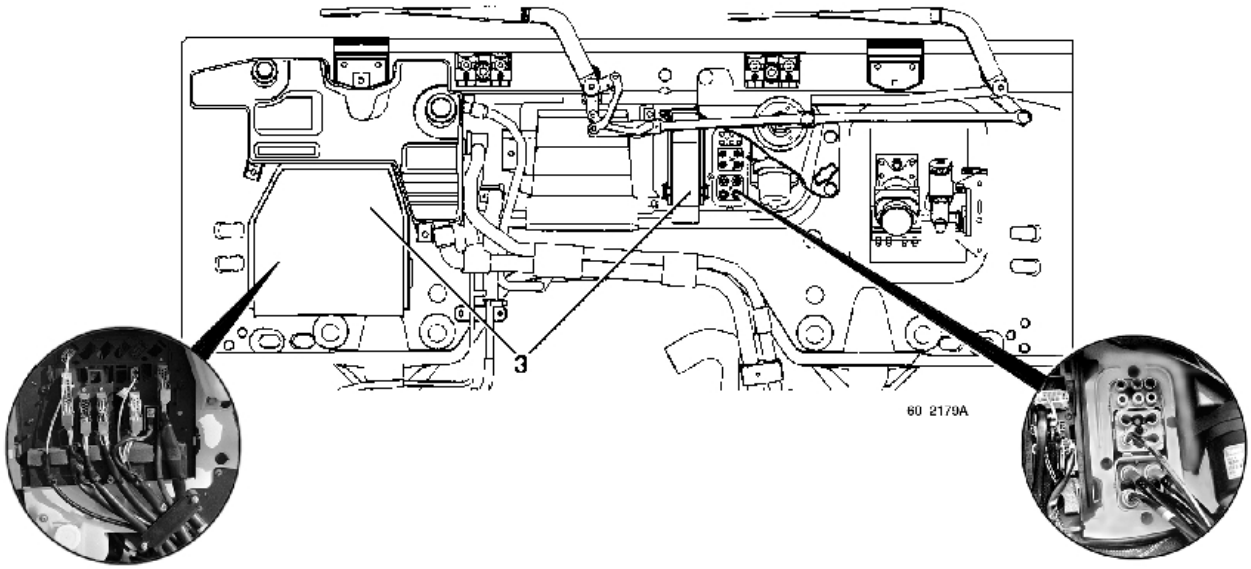
1 - Hole with maximum diameter 45 mm to be drilled in the circular impression on the passenger side floor. Watch out for the screen wash reservoir located under the floor near this impression.



2 - Passage through the RH or LH side rail of the cab. Cut the interior lining.



3 - Passage of wiring harnesses through unused locations in front end connecting zones.



“REFUSE COLLECTOR” VEHICLE

8. “REFUSE COLLECTOR” VEHICLE

- 16 tonnes GVW twin tyre fitment at rear available in three wheelbases 3070, 3350, 3650 on MIDLUM C base,
- 15.7 tonnes GVW (single tyre fitment at rear) available in three wheelbases 3070, 3350, 3650 on MIDLUM C base,

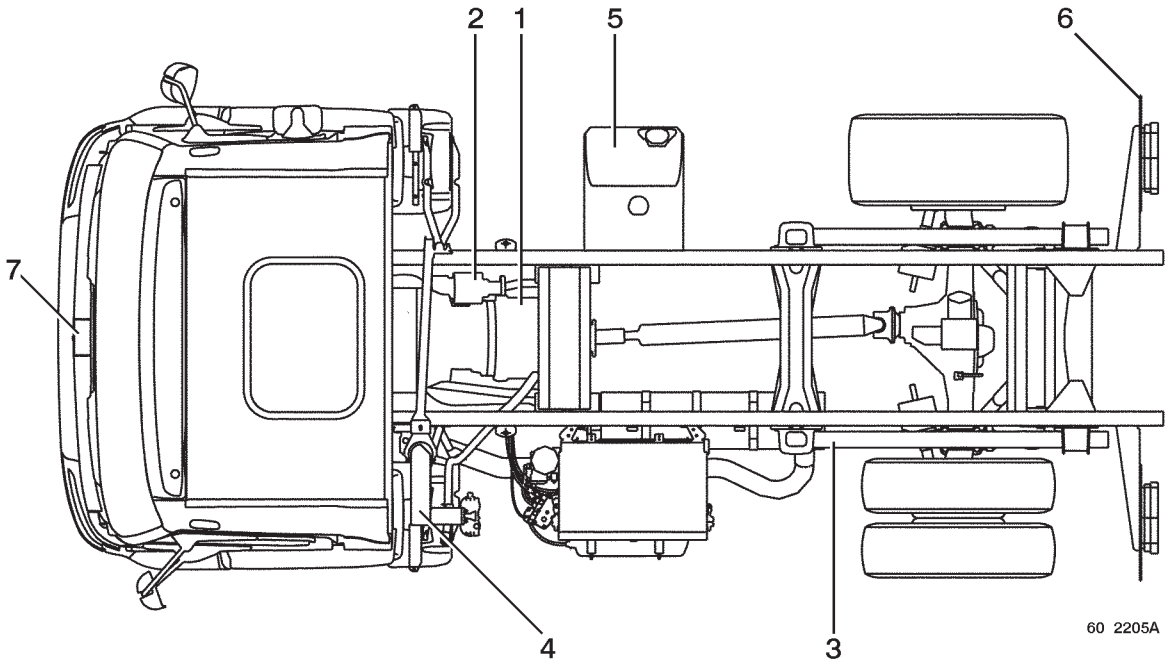
Day cab only.

Refuse collector vehicle special features

- refuse collector bodybuilder electrical pre-arrangement,
- automatic transmission (**1**),
- gearbox-mounted continuous high-power PTO with regulated fast idling control, (2 programmed engine speeds available, plus chassis-mounted variable speed control),
- reinforced front parabolic leaf spring suspension,
- reinforced dissymmetrical rear suspension (**3**),
- vertical exhaust (**4**),
- 80 litre fuel tank (**5**),
- without rear run-under guard (**6**),
- RH door with peep window,
- reversing buzzer,
- ripper presence 30 km/h speed limiter,
- without spare wheel,
- mileometer without tachograph,
- frontview mirror (**7**),
- passenger bench seat,
- adapted grab handles,
- central passenger holding bar.

Options

- roof level engine air intake,
- single rear tyre fitment,
- fixed passenger seat,
- engine hourmeter in cab.

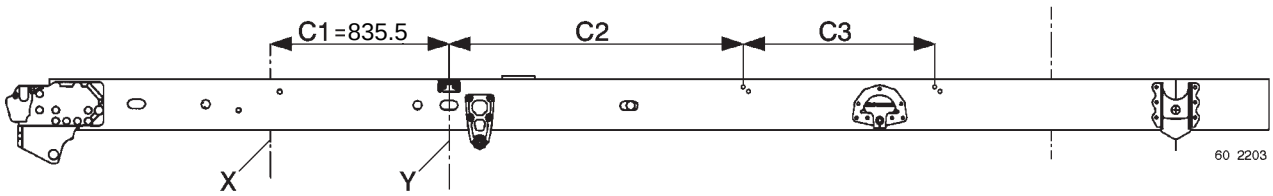


8.1 Longitudinal positioning of brackets on chassis

The first bracket is installed on the vehicle - the other brackets are not supplied. The dimensions indicate the position of the drilling only.

8.1.1 MIDLUM C refuse collector

E - wheelbases
X - axle centre-line
Y - first bracket centre-line

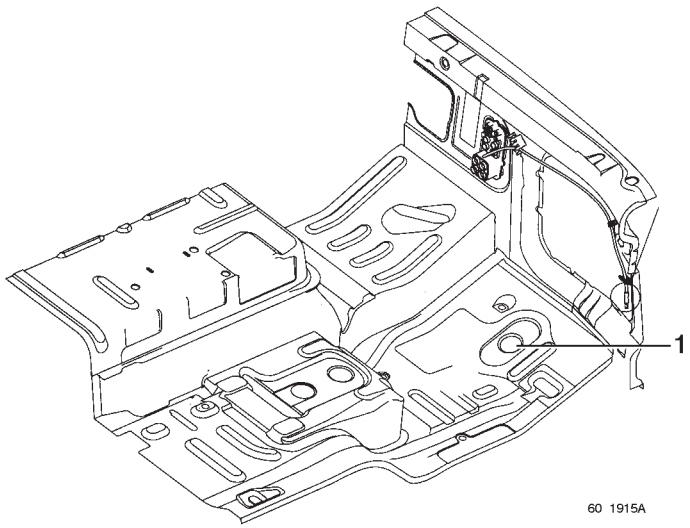


E	C2	C3
3070	1739.5	
3350	1367.5	650
3650		950

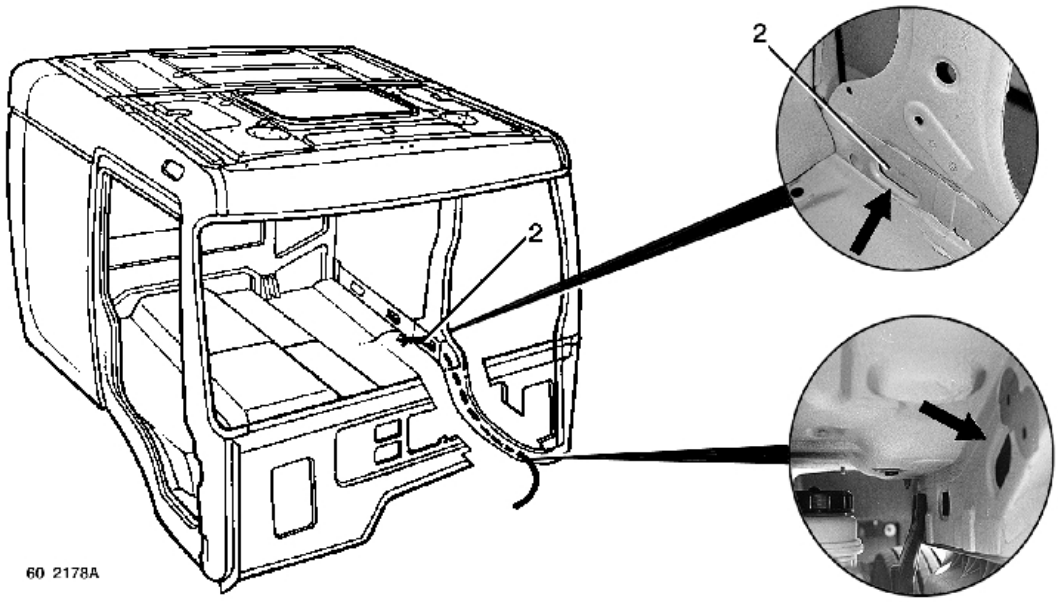
8.2 Passage of wiring harnesses and compressed air pipes through cab

Three passages are possible for routing the wiring harnesses from the inside to the outside of the cab:

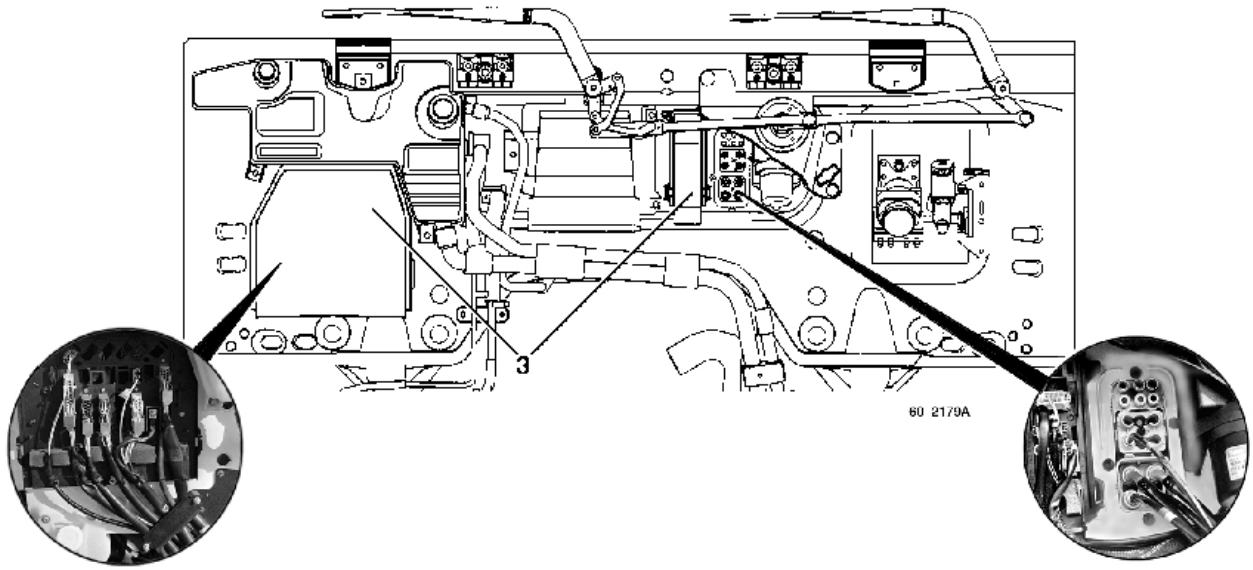
1 - Hole with maximum diameter 45 mm to be drilled in the circular impression on the passenger side floor. Watch out for the screen wash reservoir located under the floor near this impression.



2 - Passage through the RH or LH side rail of the cab. Cut the interior lining.



3 - Passage of wiring harnesses through unused locations in front end connecting zones.



8.3 Electrical pre-arrangements for refuse collectors

Available power supplies in cab under the connection unit

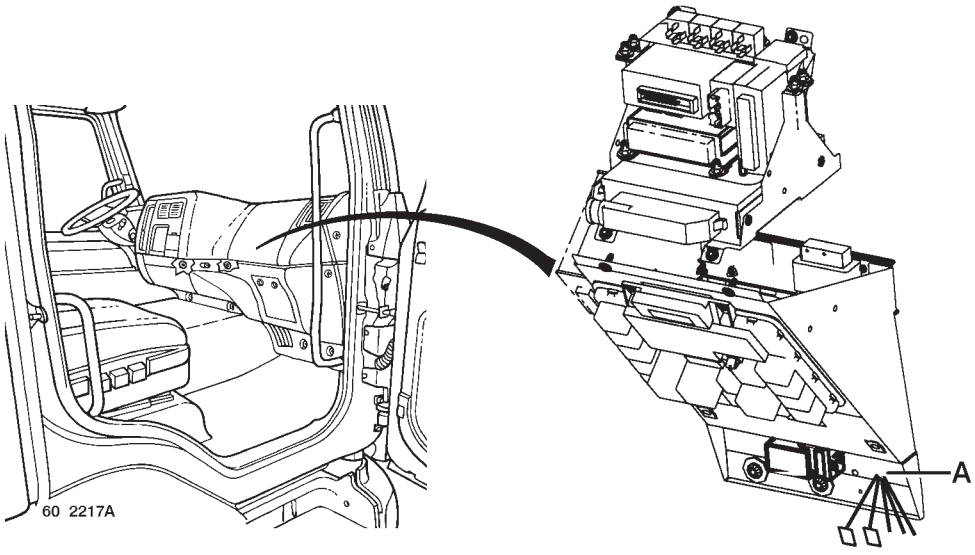
4-way yellow connector FCI (**A**):
- terminal 1: ALLISON automatic transmission PTO engagement (wire N° 818)
- terminal 2: 30 km/h speed limitation (wire N° 5027)
- terminal 3: compacting demand (wire N° 8067)
- terminal 4: reversing forbidden (wire N° 5026).

8-way red connector FCI (**A**):
- terminal 1: PTO 1 fast idling (wire N° 88)
- terminal 2: revolving beacons information (wire N° 323)
- terminal 3: fast idling variable speed deceleration (wire N° 045)
- terminal 4: fast idling variable speed acceleration (wire N° 047).
- terminal 5: zero speed information (wire N° 1025).
- terminal 6: PTO 2 fast idling (wire N° 1026).
- terminal 7: reversing lights information (wire N° 608).
- terminal 8: chassis alert warning light (wire N° 8084).

Four wires (**A**) on stand-by, equipped with 6.35 spade terminals deliver cab available power supplies:
- wire 208: after master switch “+” power supply
- wire 632: lighting, side lights “+” power supply
- wire 275: after ignition “+” power supply
- wire 202: batteries “+” power supply

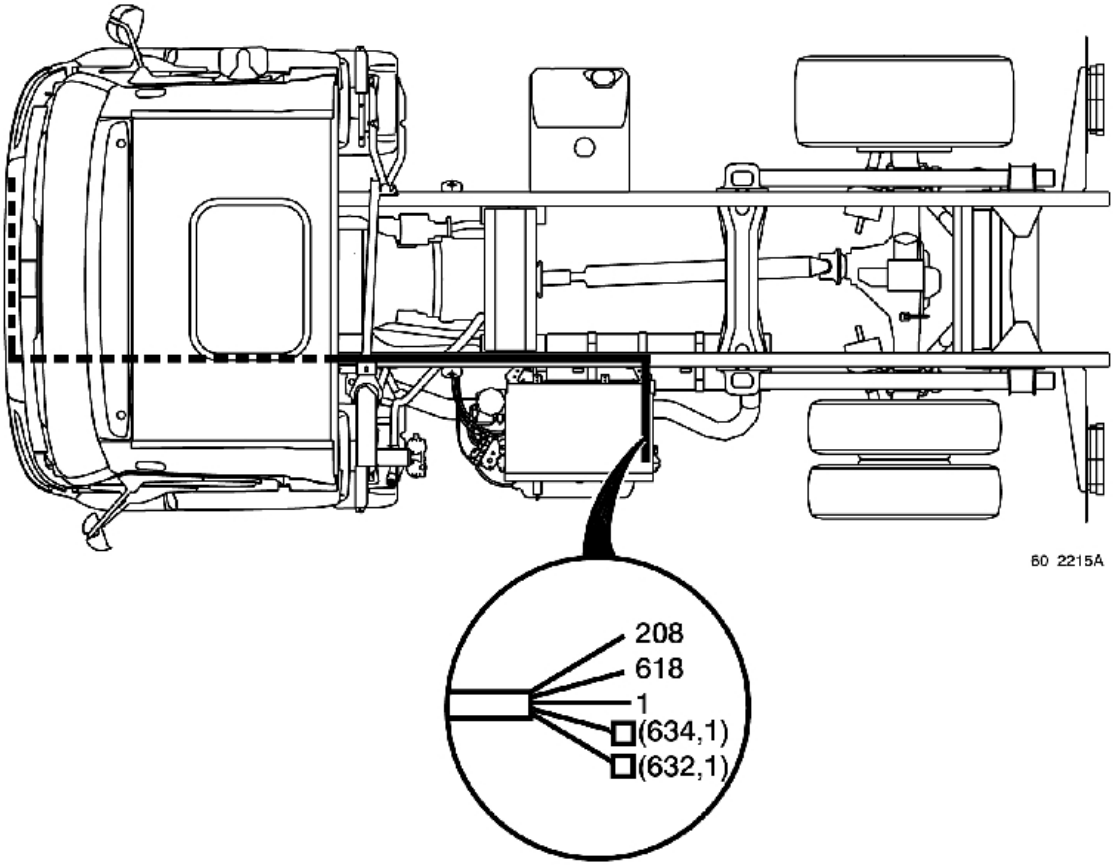
To make the earth, connect up to an earthing point on the inside of the cab (see chapter C-3.1).

IMPORTANT
Wires N° 208 and 632, each supplied through one single fuse, deliver the available power supplies in parallel into the cab and to the front end. Consequently, the amperage crossing the supply fuse is equal to the sum of the amperages delivered by the two ends of each line. This amperage should not exceed 15 Amps.



In the battery compartment

- Power supplies available at the ends of the wiring harness on stand-by in the battery compartment:
  Two 2-way connectors: lateral lights power supply (earth: wire N° 1, “+” lighting: wire N° 632 on RH side and 634 on LH side).
  wire N° 208: after master switch “+” power supply
  wire N° 618: chassis lighting (10A) “+” power supply, controlled by chassis lighting switch



8.4 Assembly of lateral signalling installation kit

This optional kit is supplied in the cab, not assembled upon delivery of the new vehicle.

It serves for installing the lateral signalling feature of the equipment without having to convert the vehicle's electrical system.

Comply with the regulations in force for positioning the lateral lamps. The wiring harnesses for the lateral lamps must be fastened and protected against heat radiation (electric retarder and exhaust in particular).

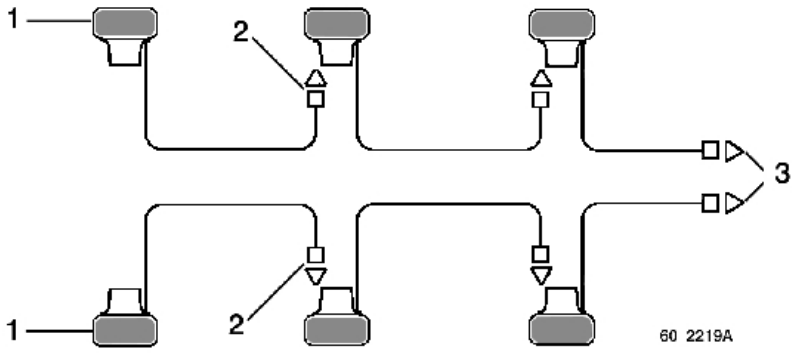
Make-up

6 to 8 lateral signalling lamps, comprising:
- one wiring harness 5 metres long complete with male connector,
- one female connector for interconnecting the lamps.

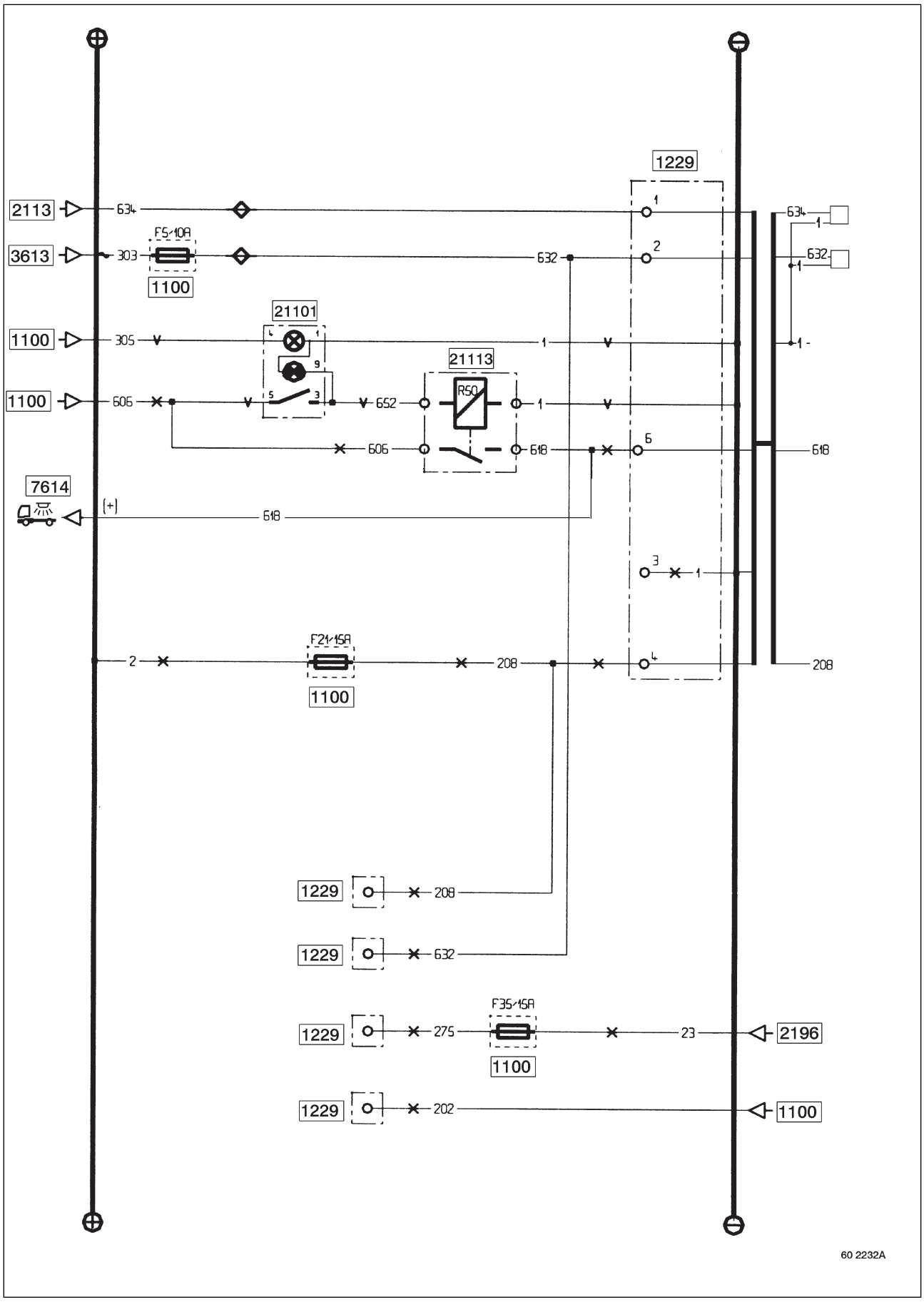
On-vehicle hook-up

The lamps are connected in series to one another, the first in the chain being connected to the vehicle.
The connection point on-vehicle is:
- 2-way connectors JPT of the available power supplies wiring harness in the battery compartment if the vehicle is thus equipped,
- rear lamps for vehicles equipped with rear lighting bar (by tapping),
- registration plate lamp on vehicles equipped with rear run-under guard (by by-pass).

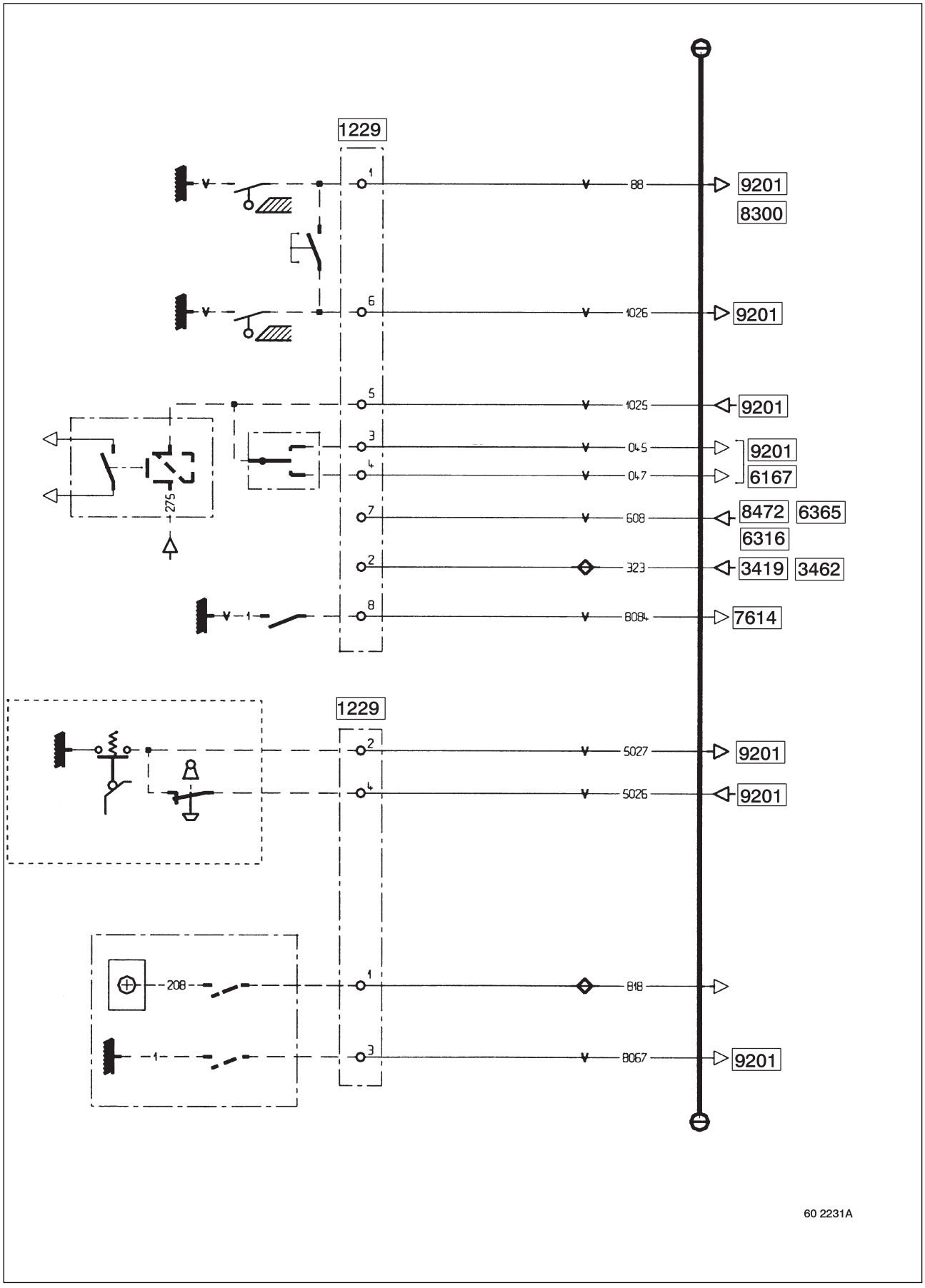
1 - lateral signalling lamps
2 - connector to be plugged into the connector of the next lamp
3 - connector to be plugged into the vehicle (battery compartment, rear lamps or registration plate lamp).



8.5 Electrical diagram for “refuse collector vehicles” optional available power supplies



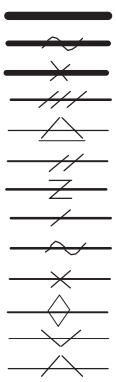
Electrical diagram for “refuse collector vehicles” optional available power supplies



Key

1100 - Fuses
1229 - Chassis-cab connection unit
1335 - Bodybuilder available power supplies connector
2113 - Trailer socket, 7-pin type 24 N
2196 - After ignition “+” power supply (**R1**)
3419 - Revolving beacon(s) relay
3462 - Revolving beacon(s) control
3613 - RH front side/parking lamp
6167 - Steering column fingertip controls (lights, signalling, windscreen wiper, transponder, cruise control)
6316 - reversing lights relay
6365 - reversing buzzer control
7614 - Principal display
8300 - Power take-off
8472 - Reverse gear switch
9201 - Vehicle electronic control unit (VECU)
21101 - Bodybuilder equipment control
21113 - Bodybuilder equipment available power supply relay (**R50**)
21120 - Bodybuilder equipment control N° 2

Cable cross-section and colour



75 mm^2
60 mm^2
50 mm^2
25 mm^2
16 mm^2
10 mm^2 – Ivory
7 mm^2 – Pink
5 mm^2 – Ivory
3 mm^2 – Pink
2 mm^2 – Grey
1 mm^2 – Green
0,6 mm^2 – Grey
0,35 mm^2 – Orange

Assignment of fuses concerning electrical pre-arrangements

Fuse	Amperage	Wire N°	Function
F4	10	634	LH lateral lights power supply
F5	10	632	RH lateral lights power supply
F21	15	208	After master switch “+” power supply
F43	10	618	Power lighting power supply
		8083	Equipment power supply - Machine unlocking power supply
F35	105	275	After ignition “+” power supply

Do not exceed the max. currents of the switches; if you do, relay the power supply.

8.6 Bodywork fastening kit (located in cab and supplied with this pre-arrangement)

20 setbolts HM 14x150x60, class 10.9
2 setbolts HM 14x150x69, class 10.9
2 setbolts HM 14x150x110, class 10.9
48 plain washers 14x30x5
12 cone washers “Belleville” type
24 flanged locknuts DRH M14 class 10

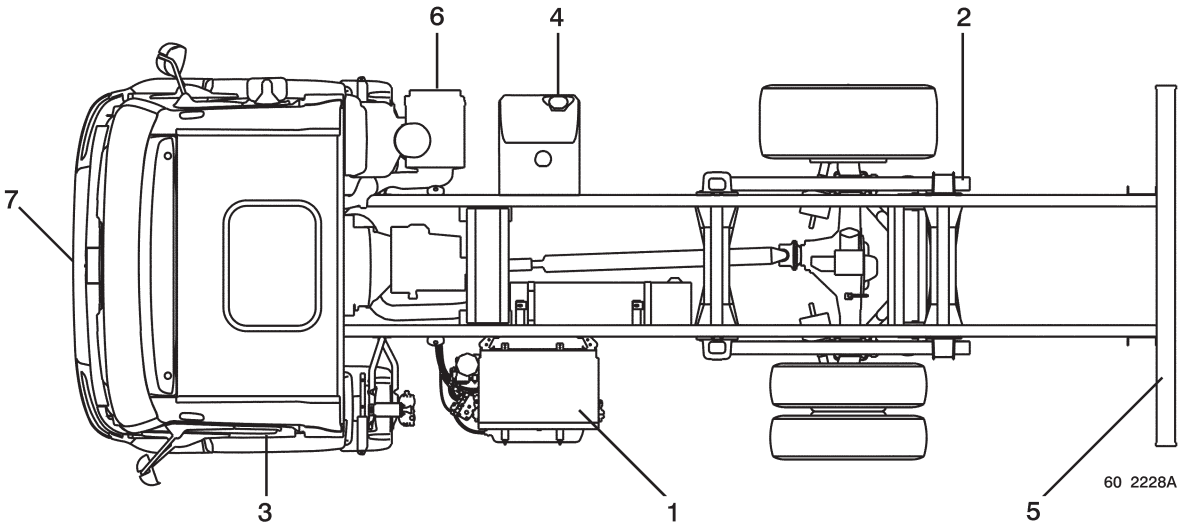
“ROAD SWEEPER” VEHICLE

9. ROAD SWEEPER VEHICLE

- 10 & 12 tonnes GVW available in two wheelbases 3070, 3350 on MIDLUM C' base,
- 15 tonnes GVW available in three wheelbases 3350, 3650, 3950 on MIDLUM C base.
  Single tyre fitment solution non-standard.

Road sweeper special features

- level 2 bodybuilder electrical pre-arrangement (see chapter B-5),
- dissymmetrical rear suspension (**2**),
- right-hand drive,
- LH door with peep window,
- lateral exhaust,
- plastic 80 litre main fuel tank (**4**),
- with run-under guard (**5**),
- mileometer,
- with battery isolation switch,
- reversing buzzer,
- roof level engine air intake (**6**),
- without spare wheel,
- frontview mirror (**7**).

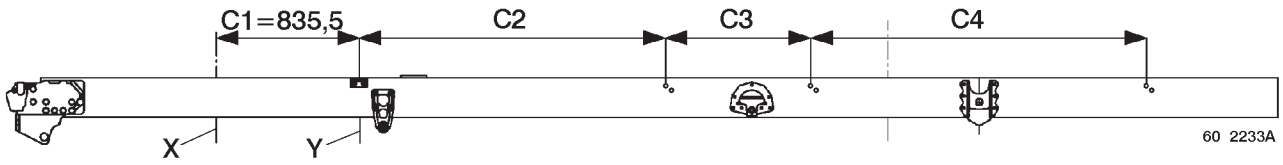


9.1 Longitudinal positioning of brackets on chassis

The first bracket is installed on the vehicle - the other brackets are not supplied. The dimensions indicate the position of the drilling only.

9.1.1 MIDLUM C'/C road sweeper

E - wheelbases
X - axle centre-line
Y - first bracket centre-line

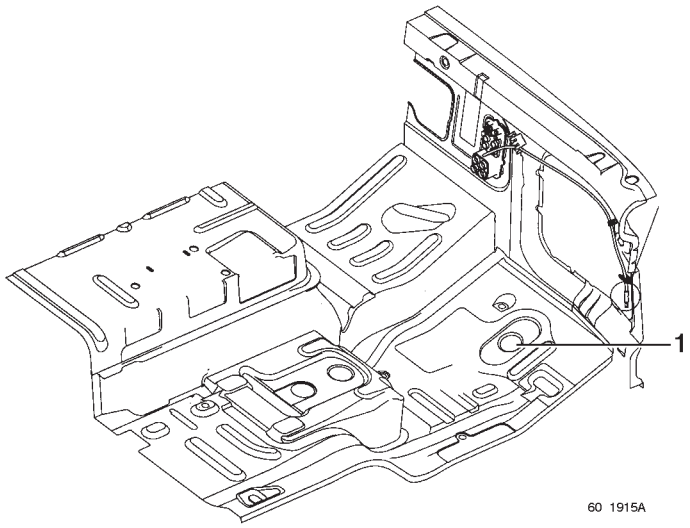


E	C2	C3	C4
3070	1740	1642	
3350	1368	650	1867
3650		950	1912
3950	1638	980	

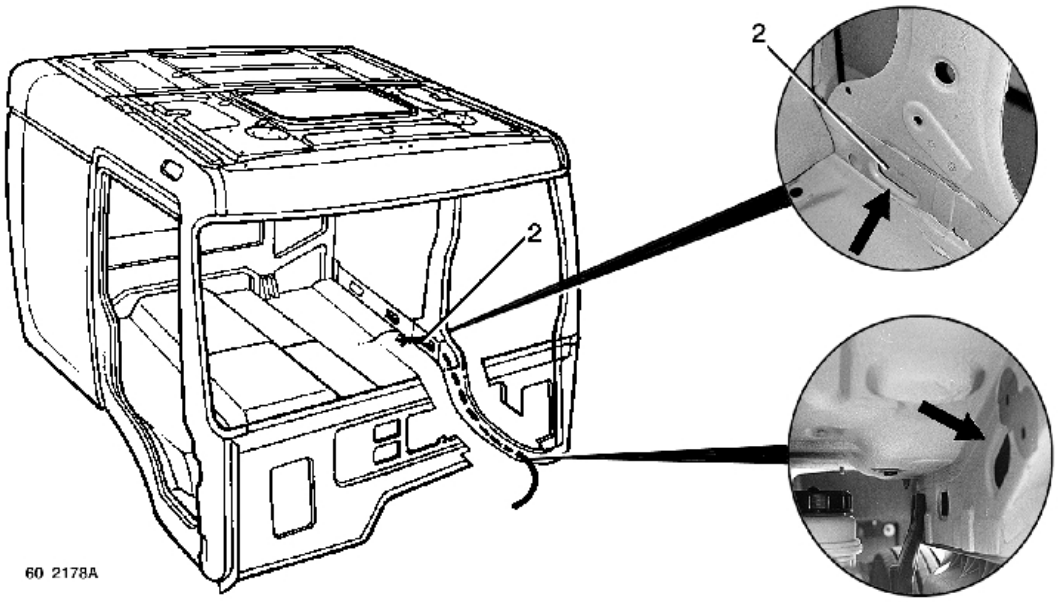
9.2 Passage of wiring harnesses and compressed air pipes through cab

Three passages are possible for routing the wiring harnesses from the inside to the outside of the cab:

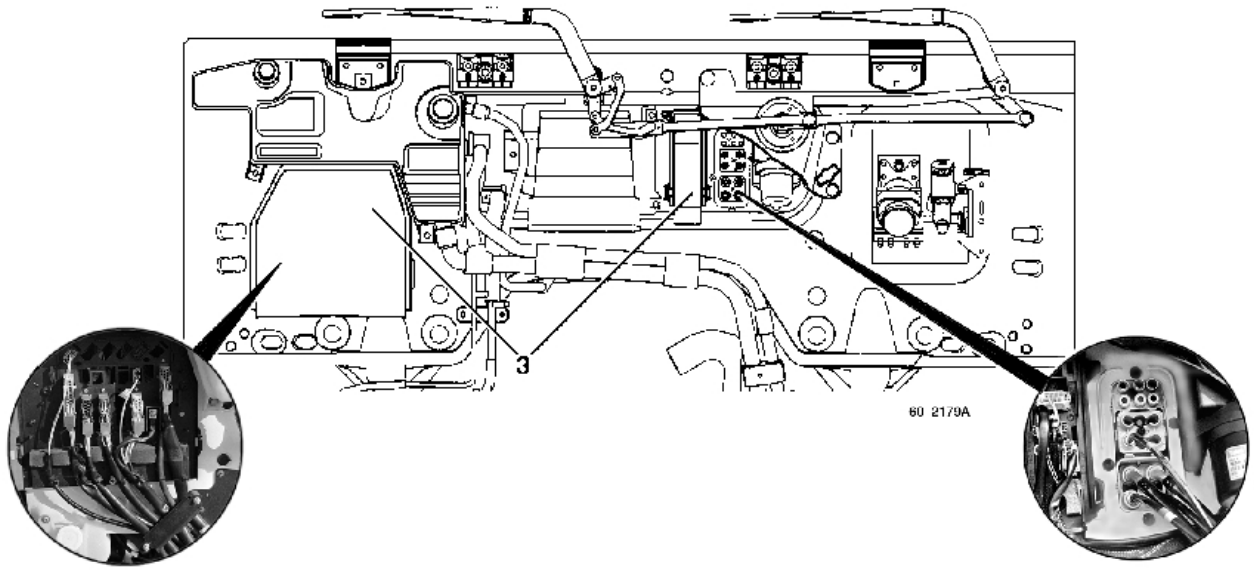
1 - Hole with maximum diameter 45 mm to be drilled in the circular impression on the passenger side floor. Watch out for the screen wash reservoir located under the floor near this impression.



2 - Passage through the RH or LH side rail of the cab. Cut the interior lining.



3 - Passage of wiring harnesses through unused locations in front end connecting zones.



“LIGHT FIRE TENDER” VEHICLE

10. LIGHT FIRE TENDER VEHICLE

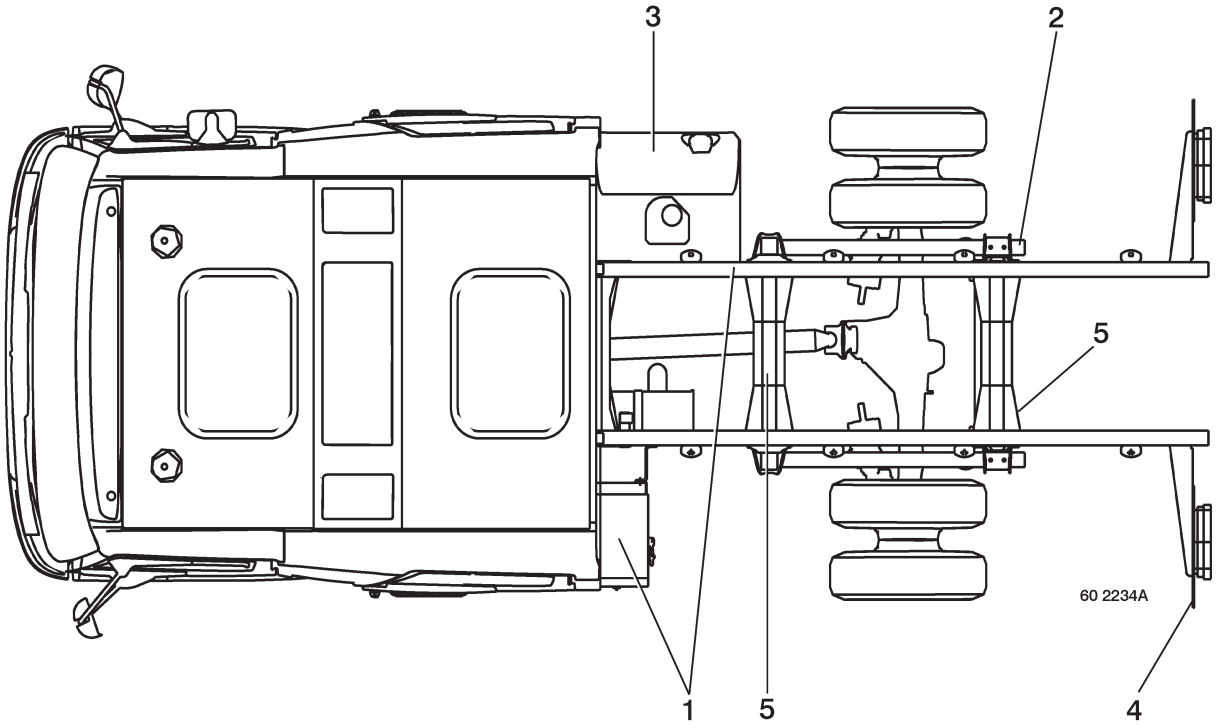
- 10 tonnes GVW available in one wheelbase 3250 on MIDLUM B base,

Light fire tender special features

- fire brigade bodybuilder electrical pre-arrangements (**1**),
- EATON 4106 OD gearbox + power take-off 2903P,
- 4-door cab (6/7 places),
- reinforced front parabolic leaf spring suspension,
- reinforced rear parabolic leaf spring suspension (**2**),
- lateral exhaust with internal outlet,
- plastic 130 litre main fuel tank (**3**),
- adjustable fast idling,
- lamps mounted on lighting bar (**4**),
- pneumatic battery isolation switch,
- loose spare wheel,
- 9.5 R 17.5 XYZ tyres,
- turned over rear spring hanger crossmembers (**5**),
- white bumper,
- cab pre-arrangements (working spotlamp with remote control, radio antenna, earth braid on doors, foot-operated horn control, special steering column trim, self-adhesive reflectors on doors...).

Options

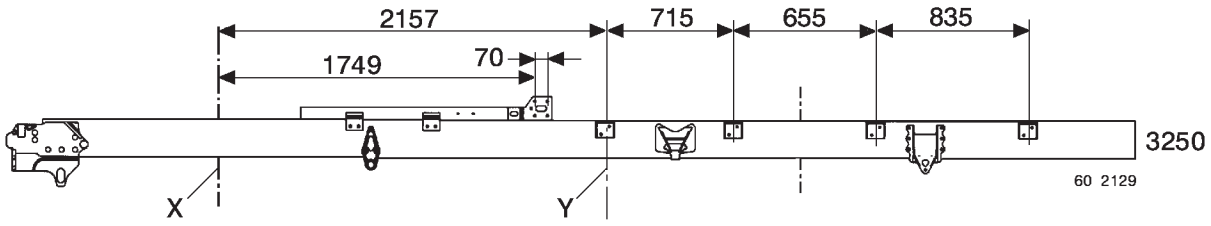
- blue revolving beacons.



10.1 Longitudinal positioning of brackets on chassis

10.1.1 MIDLUM B 10 tonnes 4-door light fire tender

E - wheelbases
X - axle centre-line
Y - first bracket centre-line



10.2 Light fire tender electrical pre-arrangements

The light fire tender is equipped with specific electrical pre-arrangements.
For MIDLUM Euro 3, contact the technical sales engineer.

“BUILDINGS & PUBLIC WORKS” VEHICLE

11. BUILDINGS & PUBLIC WORKS VEHICLE

- 7.5 - 8.5 - 10 tonnes GVW available in four wheelbases 2700, 2950, 3250, 3850 on MIDLUM B base,
- 12 tonnes GVW available in four wheelbases 3070, 3350, 3650, 3950 on MIDLUM C' base,
- 13 - 14 - 15 - 16 tonnes GVW available in four wheelbases 3070, 3350, 3650, 3950 on MIDLUM C/HD/Construction base,
- 18 tonnes GVW available in four wheelbases 3650, 3950, 4250, 4450 on MIDLUM D base,
- 11.99 - 14 - 16 tonnes GVW available in four wheelbases 3070, 3350, 3650, 3950 on MIDLUM 4x4 base.

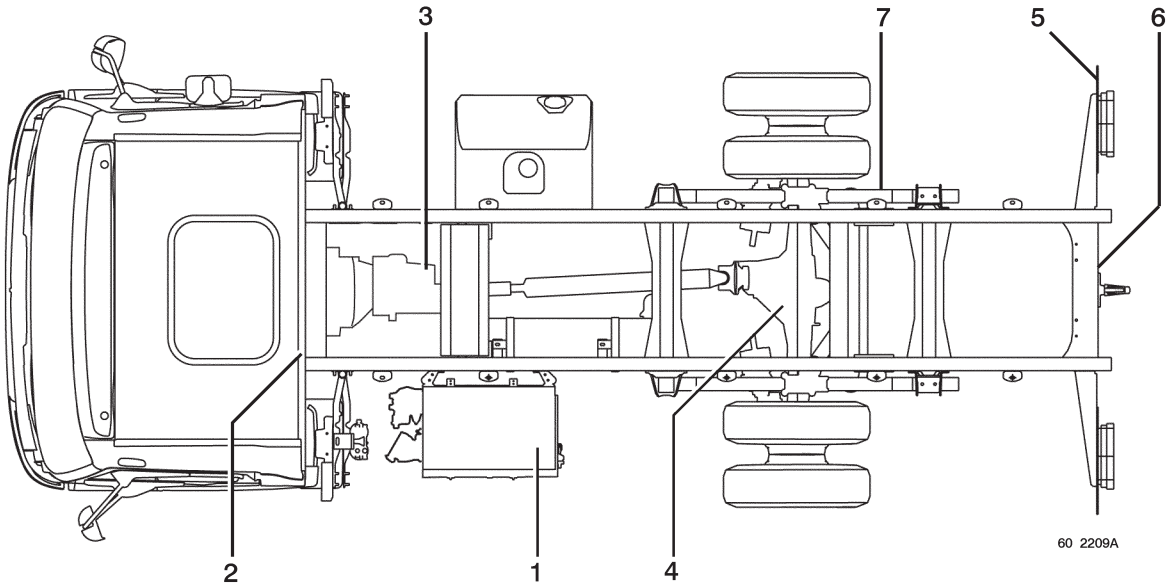
For 4-door cabs, larger wheelbases are available.

Buildings and public works vehicle special features

- level 2 bodybuilder electrical pre-arrangement (**1**) (see chapter B-5),
- glazed cab rear wall,
- gearbox-mounted PTO (**3**), power supply for engine speed limitation 1400 rpm, PTO engaged,
- rear drive axle differential lock (**4**),
- without run-under guard (**5**) (depending on country),
- towing crossmember and hook (**6**) capacity 3.5 tonnes,
- front and rear parabolic leaf spring suspensions (**7**),
- 2-place bench seat,
- changing of position of air braking appliances for installation of tipper tilting ram.

Options

- vertical exhaust,
- roof level engine air intake,
- engine hourmeter in cab,
- pre-arrangement for installation of a crane.

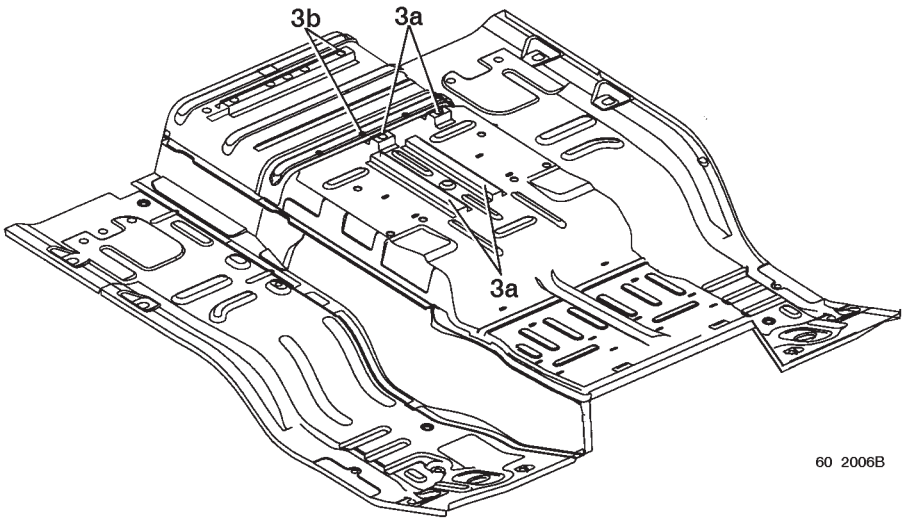


11.1 Fastening of tipper control in cab

We propose 3 ways of fastening the control in the cab.

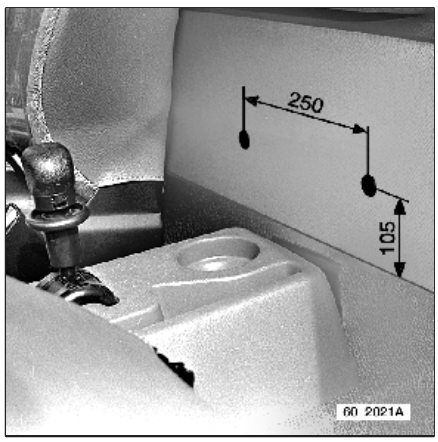
11.1.1 Location on engine tunnel

In case of absence of storage chest and bench seat on the engine tunnel, the fittings (3) can be used:
3a - day & sleeper cab
3b - sleeper cab only.



11.1.2 Location on rear wall

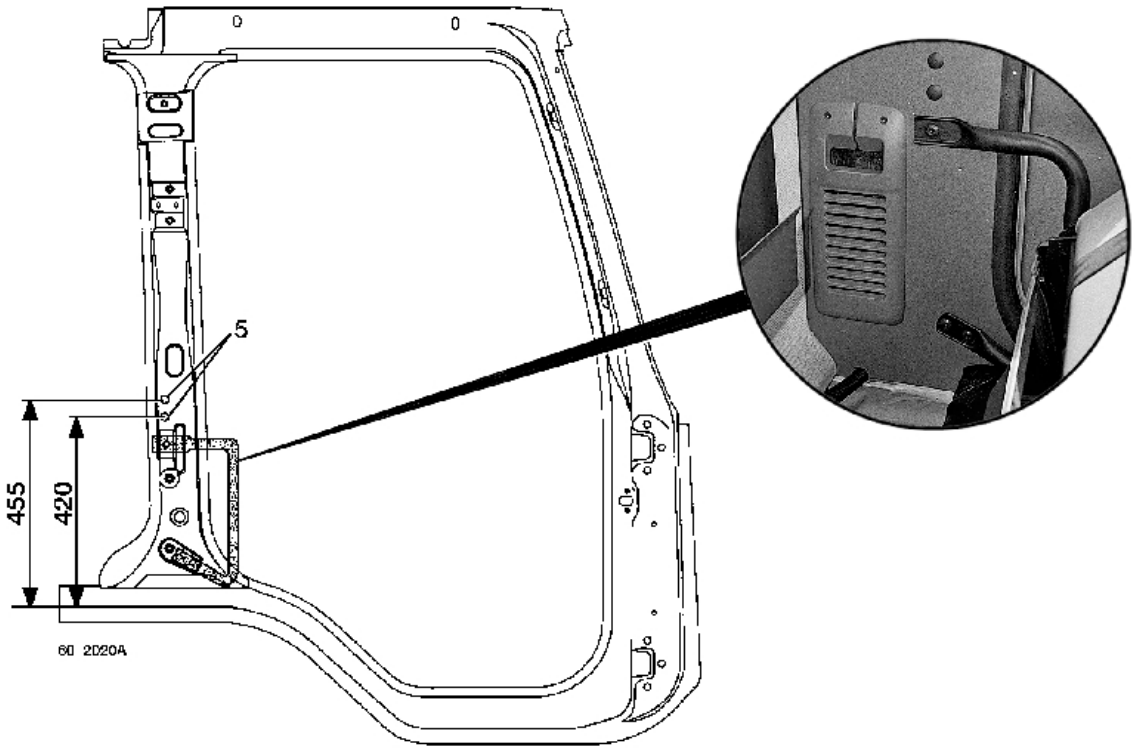
The rear wall comprises two M6 crimping nuts. Remove the two blanking plugs (**4**) to gain access to the nuts (or by taking out the setscrews securing the fire extinguisher in the day cab).



11.1.3 Location on side pillar

The side pillar comprises two M6 crimping nuts. To gain access to the crimping nuts:
- for plastic trim, remove the two blanking plugs (**5**).
- for textile trim, take off the pre-cut-out parts of the trim (**5**).

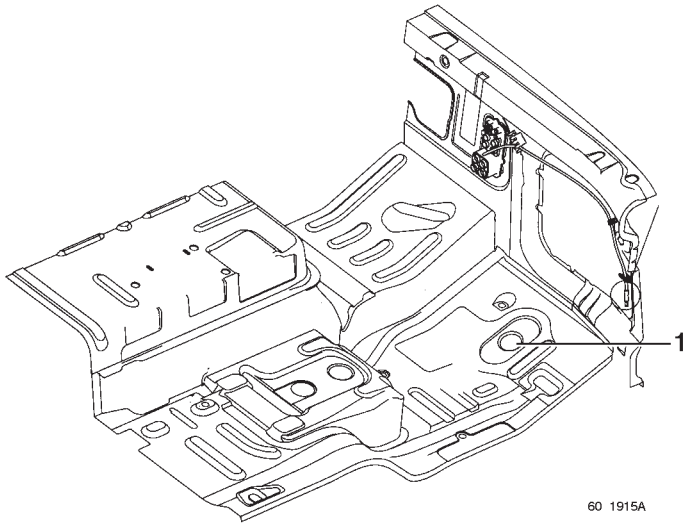
On account of its good accessibility, this location is recommended for fastening an equipment control (e.g. tipper).



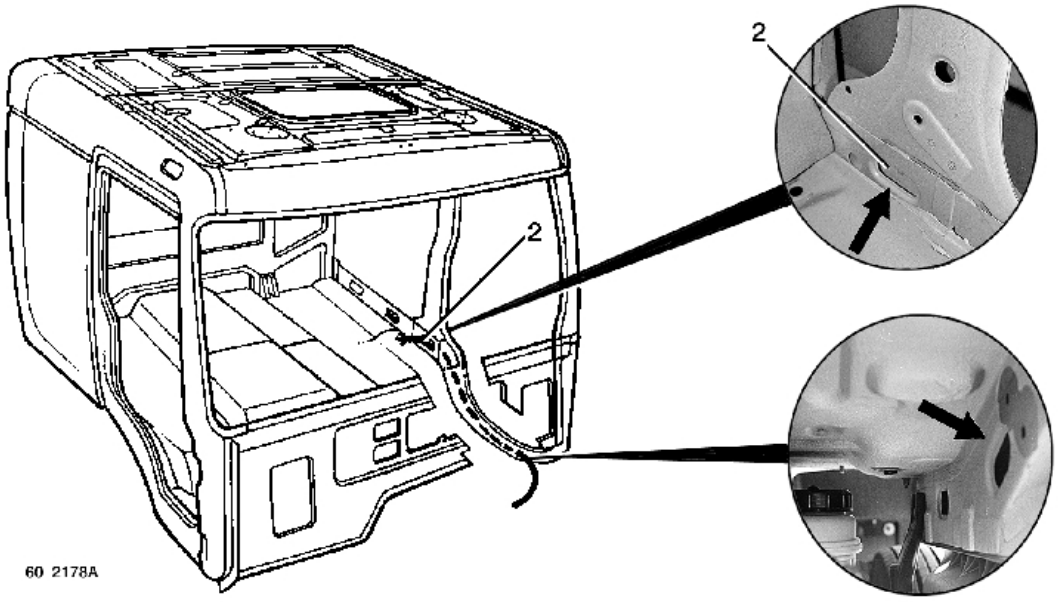
11.2 Passage of wiring harnesses and compressed air pipes through cab

Three passages are possible for routing the wiring harnesses from the inside to the outside of the cab:

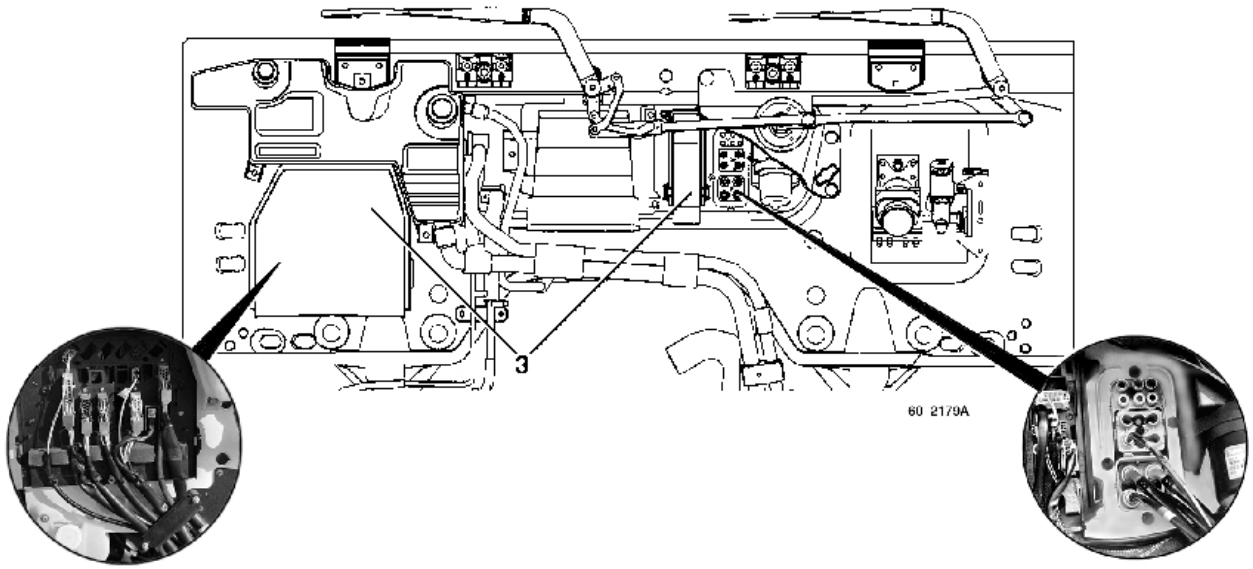
1 - Hole with maximum diameter 45 mm to be drilled in the circular impression on the passenger side floor. Watch out for the screen wash reservoir located under the floor near this impression.



2 - Passage through the RH or LH side rail of the cab. Cut the interior lining.



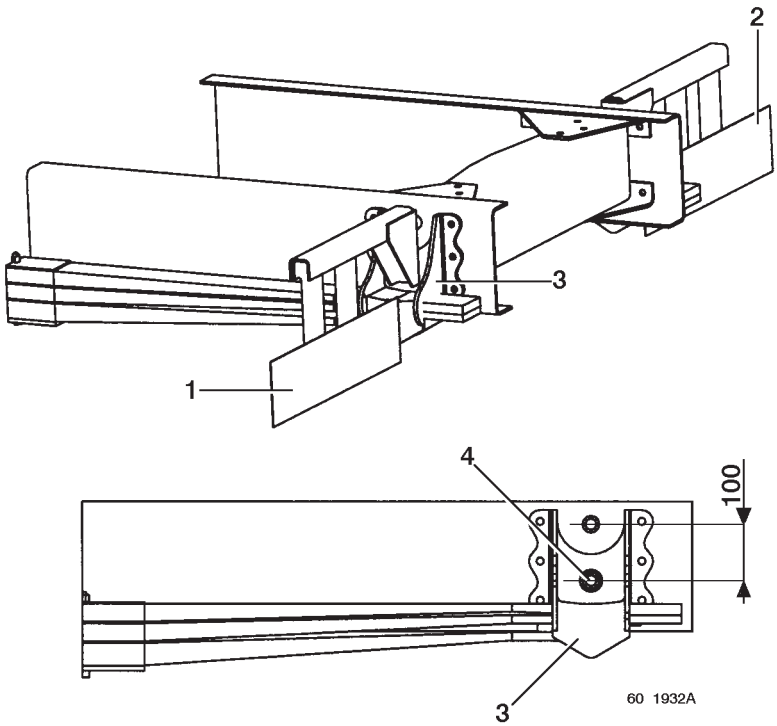
3 - Passage of wiring harnesses through unused locations in front end connecting zones.



11.3 Assembly of rear lamps to lighting bar - tractor version (on MIDLUM C/C'/D/HD/Construction only)

In the event of reduction of the rear overhang, the rear lamps can be assembled on a rear lighting bar in accordance with the assembly of MIDLUM tractors. It is then necessary to replace the lamp brackets.
Drill a 13 mm diameter hole at point (**4**).
Fit the nuts and bolts and tighten to torque.

Procurement:
- LH bracket ref. N° 50 10 478 943
- RH bracket ref. N° 50 10 478 944
- 4 collar screws M12x125x80 class 10.9 ref. N° 50 03 002 067
- 4 flanged nuts DRH M12 class 10.9 ref. N° 50 03 033 012



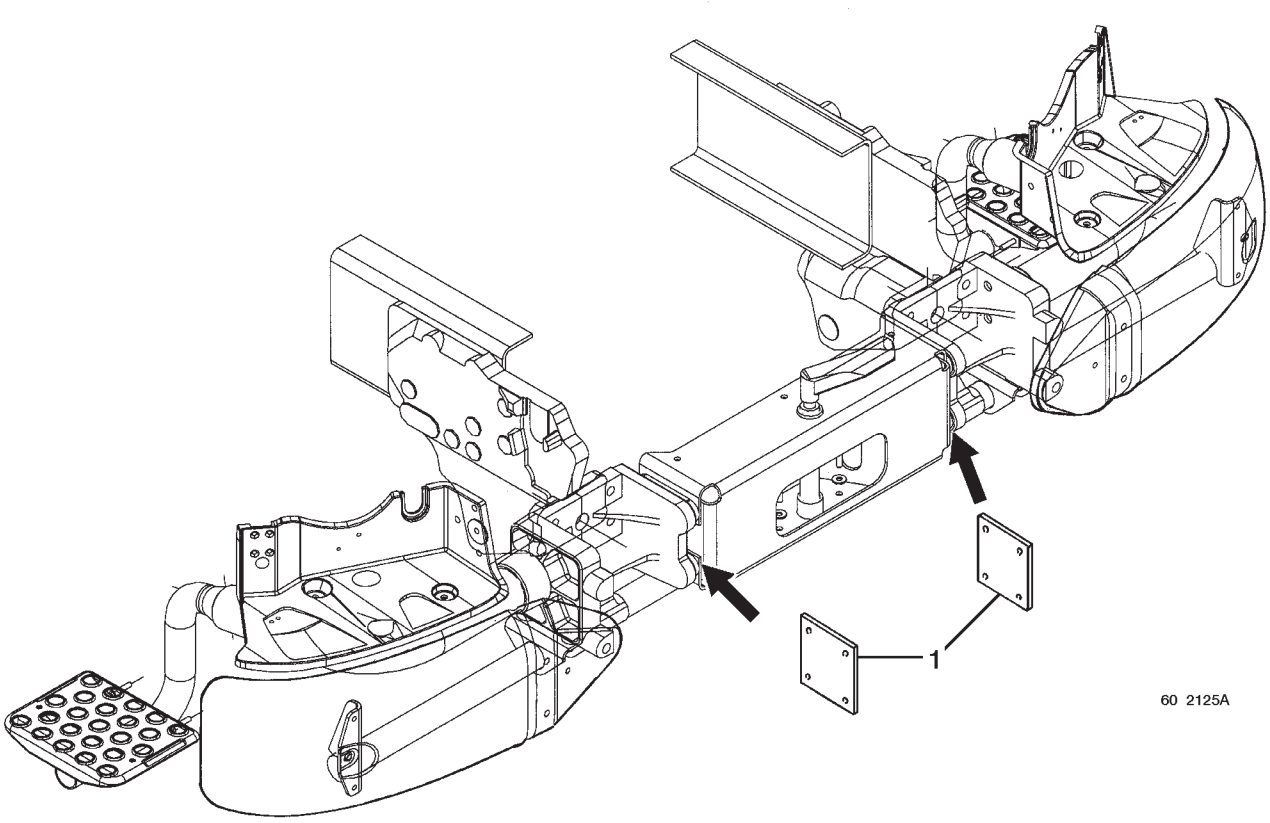
1 - LH lamp bracket
2 - RH lamp bracket
3 - spring rear hanger
4 - hole dia. 13 mm to be drilled

11.4 Fitting a tool-holder to the front of a vehicle with sheet metal bumper

MIDLUM HD/Construction/4x4/18 tonnes Construction vehicles are fitted with a sheet metal bumper from the KERAX series.

Use the shims (**1**) supplied only with the tool-holder pre-arrangement for installing the plates.

Order variant 67406, which allows the vehicle to accommodate 10 mm thick shims - take them out and replace them with the tool-holder brackets.



PRE-ARRANGEMENTS FOR INSTALLATION OF A CRANE COMMERCIAL VARIANT 20294

Available as option on all vehicles

12. BEHIND-CAB HANDLING CRANES

Assembly of the crane requires checking the conformity to regulations of the location of side/parking lights and side impact beams.
Before assembling the crane, make sure it does not exceed maximum permissible values peculiar to the vehicle (lifting moment, distribution of loads, height of centre of gravity).
Assembly of the crane to the bracket remains under the full responsibility of the equipment manufacturer.

12.1 Maximum lifting moment

GVW (tonnes)	Maximum moment (tonne.metres)
7.5	$M \leq 5$
10	$M \leq 7$
12	$M \leq 8$
14	$M \leq 9$
16	$M \leq \times 10$

12.2 Attachment

On vehicles with day or sleeper cabs, the crane must be fastened using support plates defined by RENAULT V.I. (variants 20288, 20289 for tippers with or without crane - 20296, 20297 for platforms with or without crane - 20295 for tail lifts) and are available from the RENAULT V.I. Spare Parts department.

The plates are specific to the vehicle (MIDLUM B, C', C, D, HD/Construction)) and its cab (day, sleeper).

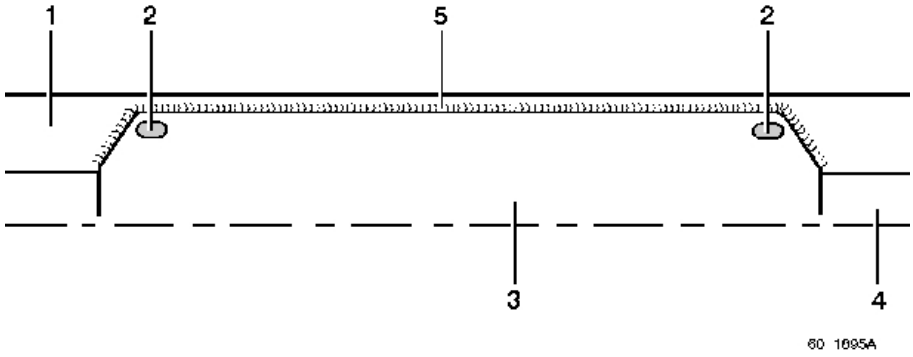
Assembly of a one-piece sub-frame from the rear of the cab to the extremity of the chassis, with bevelled cut-out at the front is compulsory.

Before carrying out any work, remove the first body fixing bracket and any rivets impeding the positioning of the plates to the sidemembers.

IMPORTANT at the time of subsequent assembly
The plates assembly operation may require work on such components as;
- electrical cables,
- compressed air pipe bundles,
- cab tilting hydraulic assistance pipes,
- air tanks, fuel tanks, wings, battery brackets,
- cab rear brackets,
- gearbox crossmember,
- engine brackets.
To limit on-vehicle modifications as much as possible, it is permitted to practise recesses in the brackets to enable them to be installed without having to touch flexible pipes, wiring harnesses and compressed air pipes.
Assembly of the plates should not impair the fastening of components affected by the work.
Such elements must be re-assembled in the original configuration of the vehicle while observing general safety rules (consult the section "General features").
On account of manipulations on the cab tilting hydraulic system, the plates must be fitted when the cab is fully tilted and properly wedged.
Upon re-assembly, bleed the cab tilting hydraulic system without fail, while observing the recommendations described in the vehicle driving and servicing handbook.
All removed rivets must be replaced by nuts and bolts.

12.2.1 Attachment of crane brackets to the sub-frame

Crane brackets (**3**) must be welded without fail to the sub-frame (**1**). These welds must consist of a continuous weld bead (**5**) and pluggings in slotted holes (**2**). It is on the other hand strictly forbidden to weld brackets (**3**) to the chassis (**4**).



12.2.2 Attachment of crane brackets to the chassis

Use collar bolts diameter M12x125, class 10.9 with locknuts. The use of nuts with nylon ring (e.g. Nyloc) are forbidden. Tighten to torque.

Crane support plates assignment table

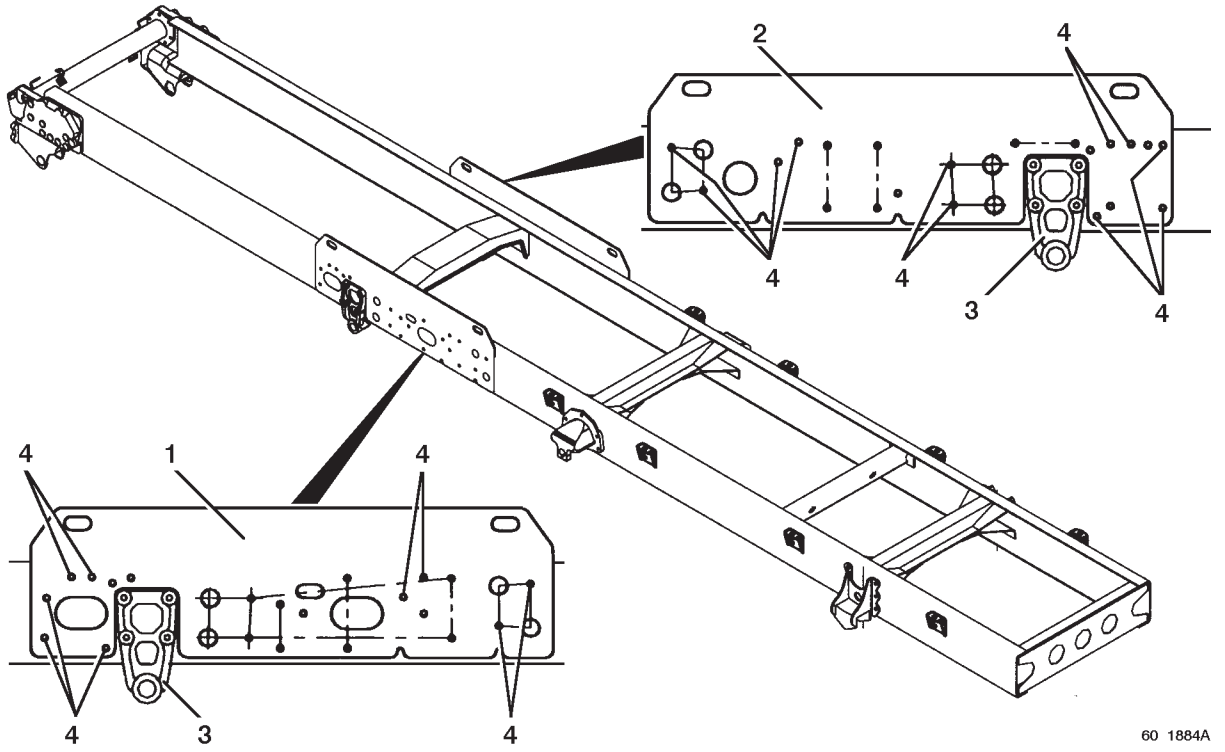
Vehicle	Cab type	Brackets reference N°	
		LH bracket	RH bracket
MIDLUM B	day	50 10 496 653	5010 496654
	sleeper	50 10 496 655	50 10 496 656
MIDLUM C'/C Construction *	day	50 10 496 659	50 10 496 660
	sleeper	50 10 496 661	50 10 496 662
MIDLUM D	day	50 10 528 429	50 10 528 430
	sleeper	50 10 528 431	50 10 528 432

(*) Crane support plates are only available for EEC vehicles.

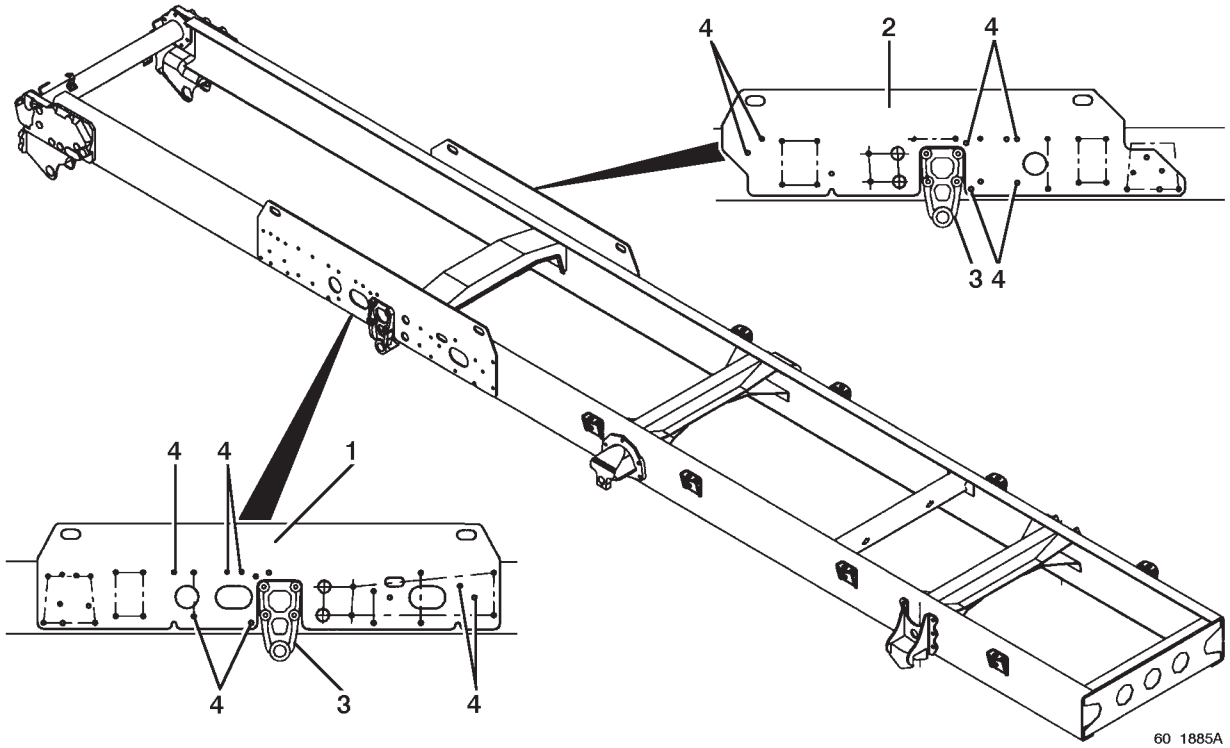
Key to diagrams on following pages:
1 - LH bracket
2 - RH bracket
3 - Front spring rear hanger
4 - Collar bolt M12x125 class 10.9 with locknut

Note
The diagrams indicate only the nuts and bolts (**4**) that must compulsorily be used on the chassis to ensure correct fastening of plates (**1-2**). These nuts and bolts may be present on-vehicle prior to assembly of the brackets (fastening the brackets). If this is not the case, use the specified nuts and bolts and tighten to torque.

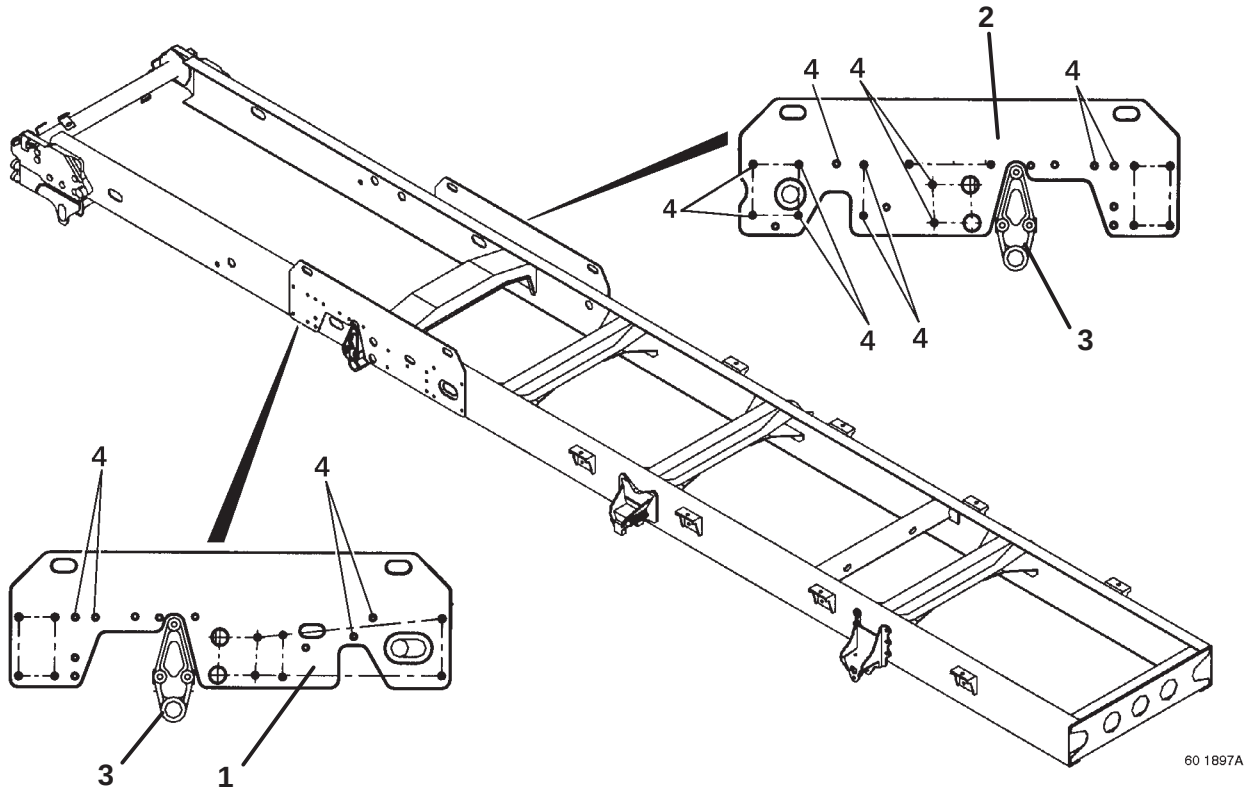
MIDLUM C'/C/D/HD Construction day cab



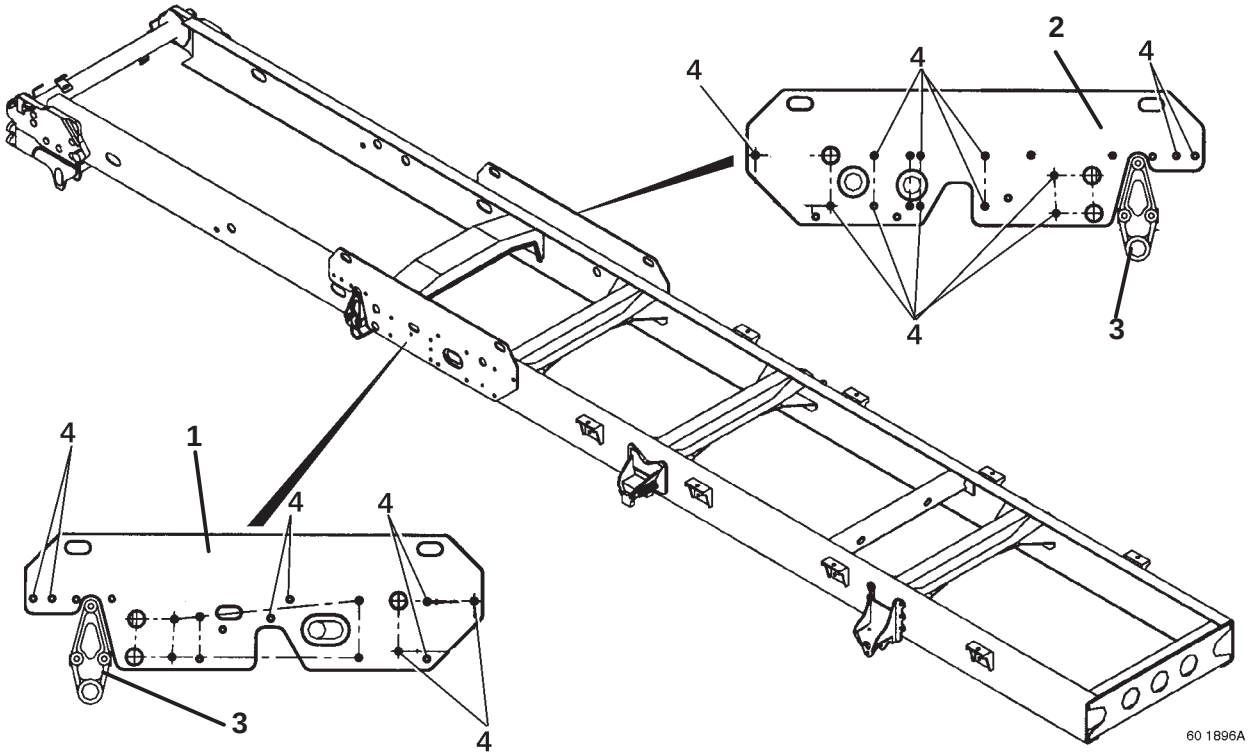
MIDLUM C'/C/D/HD Construction sleeper cab



MIDLUM B day cab



MIDLUM B sleeper cab



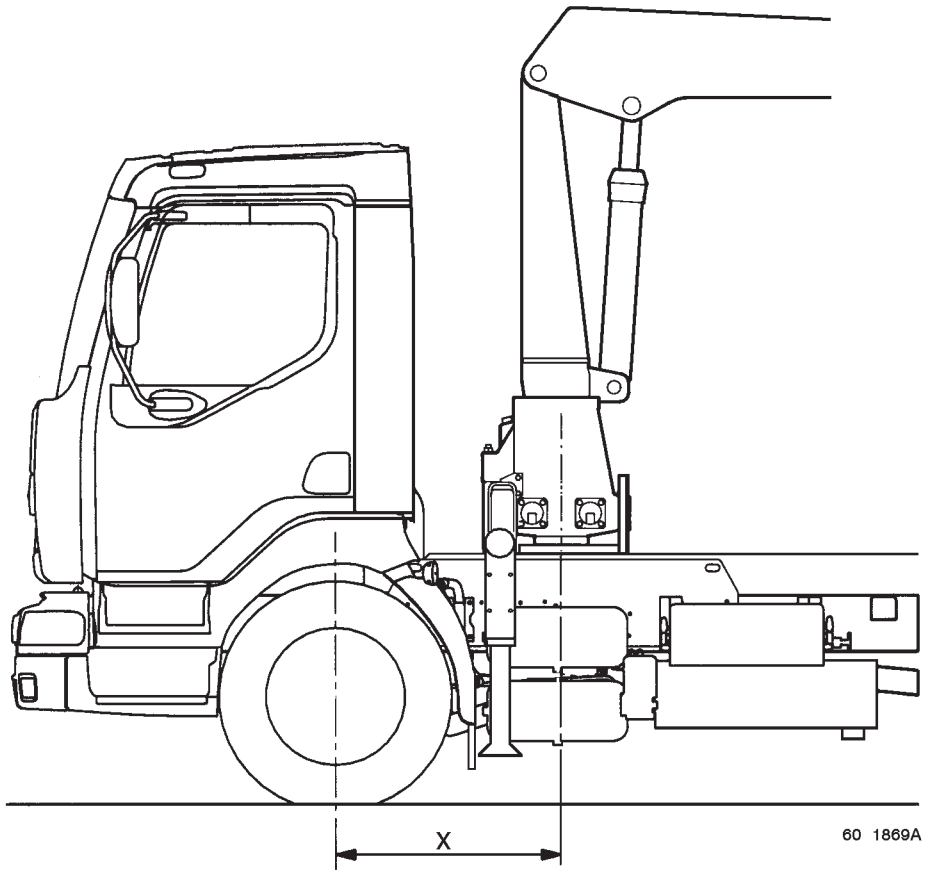
12.3 Position of vertical centre-line of crane

12.3.1 Day cab

Vehicle	Crane centre-line / front axle centre line distance (X)	
	Under-floor air intake	Vertical exhaust
MIDLUM B	900	1020
MIDLUM C'	923	1100
MIDLUM C		
MIDLUM Construction*		
MIDLUM D		

(*) Crane support plates are only available for EEC vehicles.

Positioning of the crane: the vertical axis of rotation of the crane must be situated approximately in the middle of the plates.

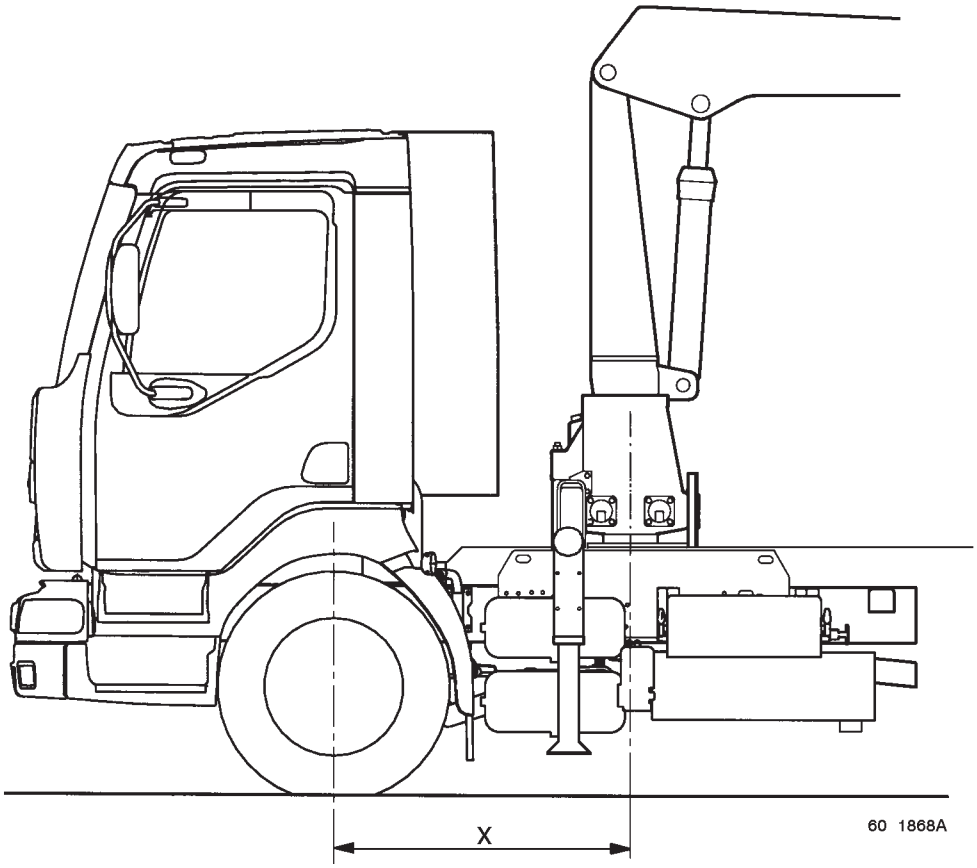


12.3.2 Sleeper cab

Vehicle	Crane centre-line / front axle centre line distance (X)	
	Under-floor air intake	Vertical exhaust
MIDLUM B	1220	1350
MIDLUM C'		
MIDLUM C		
MIDLUM Construction*		
MIDLUM D		

(*) Crane support plates are only available for EEC vehicles.

Positioning of the crane: the vertical axis of rotation of the crane must be situated approximately in the middle of the plates.



MANUFACTURER'S TECHNICAL RECOMMENDATIONS FOR REFRIGERATED VEHICLES

13. INDEPENDENT REFRIGERATOR UNIT LOCATED ABOVE THE CAB

Maximum permissible load on front axle

The installation of a refrigerator unit requires the maximum permissible load on the front axle being greater than or equal to the load necessary for installing a refrigerator unit. In the event of the maximum permissible load on the front axle being insufficient, the weight of the refrigerator unit shall be limited.

Vehicle	Maximum load on front axle (kg)		Maximum weight of refrigerator unit (kg)
	Standard	Option	
MIDLUM B 7.5 tonnes	3400	3700 (*)	450
MIDLUM B 10 tonnes	3700	4000 (*)	
MIDLUM B 12 tonnes	4000	4200(*)	
MIDLUM C' 12 tonnes	4480	–	550
MIDLUM C 12 tonnes		5000 (*)	
MIDLUM C 14 tonnes	5000	5800	
MIDLUM C 16 tonnes	5800	–	
MIDLUM D 16.9 tonnes	6300	–	–
MIDLUM D 17.9 tonnes	7100	–	–
MIDLUM HD/Construction 13 tonnes	5000	–	550
MIDLUM HD/Construction 14 tonnes	5600	–	
MIDLUM HD/Construction ` 15 tonnes	6000	–	
MIDLUM HD/Construction 16 tonnes	6300	–	

(*) essential option for the assembly of a refrigerator unit

13.1 Mechanical receiver on crankshaft pulley

A mechanical receiver (refrigerator compressor, hydraulic pump, electricity generator...), driven by the crankshaft pulley can be installed on the engine.
Transmission is via a type “AV13” vee belt.
Maximum torque transmitted by crankshaft pulley: 47 Nm.

Depending on the vehicle’s equipment, the crankshaft drive pulley for the mechanical receiver differs (two or three grooves). The extra pulley can be assembled as first fitment or as aftermarket, but it can only be installed on 3-groove crankshaft pulleys.

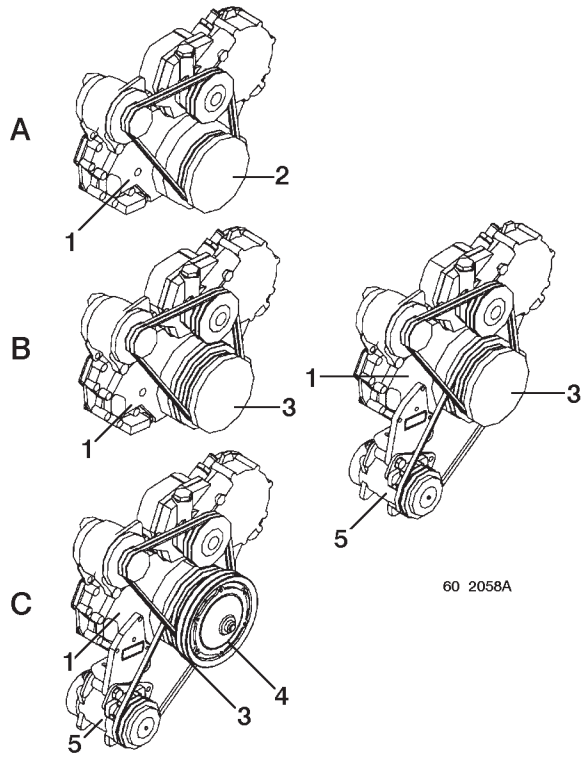
There may be four cases corresponding to three possible pulley assemblies:

IMPORTANT
To obtain the 3-groove pulley together with the accessories drive pulley, order the vehicle with variant 73410 (accessories drive pre-arrangement).

A: 2-groove crankshaft pulley
- vehicle without air conditioning and without drive pre-arrangement

B: 3-groove crankshaft pulley
- vehicle without air conditioning and with drive pre-arrangement
- vehicle with air conditioning and without drive pre-arrangement

C: 3-groove crankshaft pulley
- vehicle with air conditioning and with drive pre-arrangement



1 - engine front end
2 - two-groove crankshaft pulley
3 - three-groove crankshaft pulley
4 - extra pulley
5 - air conditioning compressor

Position of receiver on the engine
- vehicle without air conditioning:

The receiver is installed in the location provided for the air conditioning compressor. This installation requires the assembly of a 3-groove pulley.

In case (**A**), installation of the mechanical receiver requires expensive conversion of the vehicle as aftermarket and is to be proscribed.

- vehicle with air conditioning:

The receiver is installed to the LH side of the engine. This installation requires the assembly of an extra pulley.

For installation of the receiver to the engine, use an assembly kit marketed by the firms FRIDGE KING, THERMO KING and CARRIER, in strict compliance with the assembly instructions included in the kit.

Only two assemblies are officially approved by RENAULT V.I. and do not require technical agreement insofar as the installation complies with the directives of the assembly handbook.

13.2 Additional fuel tapping on fuel tank

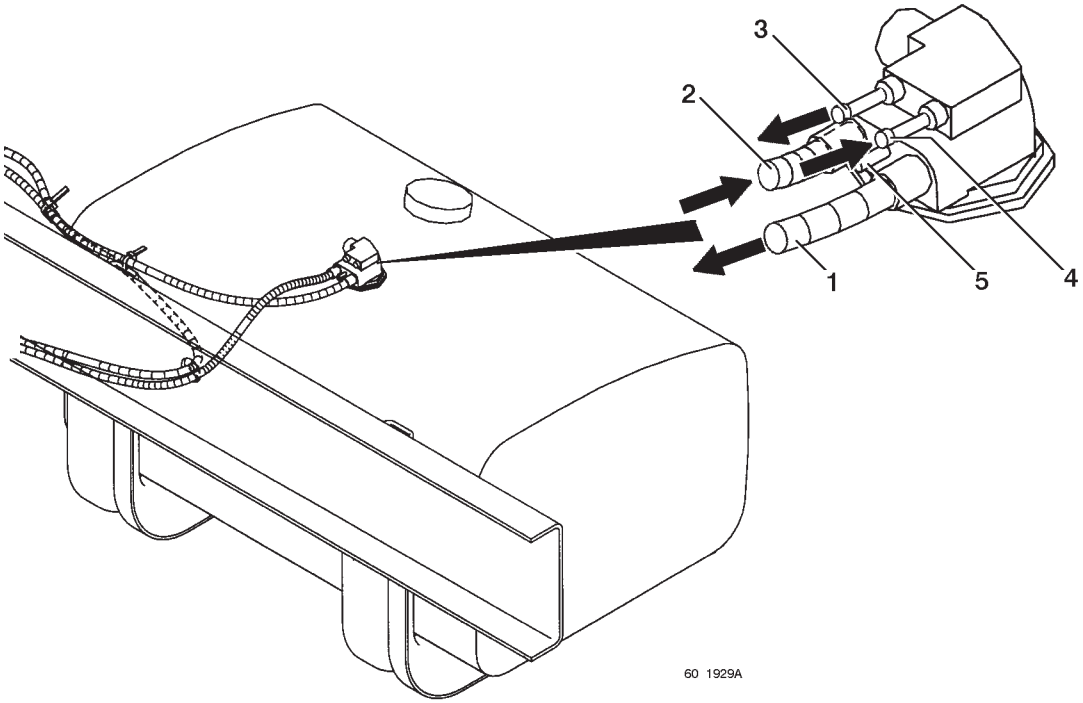
The fuel gauge includes two pipes blanked off by a breakstem blanking plug. These pipes can be used to feed an additional consumer on the vehicle (add-on heater, refrigerator unit, heat engine...).

The pipes are provided with two hexagonal sections to allow the blanking plug to be broken using two spanners. After removing the blanking plugs, deburr the pipe ends.

Installation must be performed according to standard workshop practice while observing constraints connected with heat radiation and remains under the full responsibility of the installer.

It is strictly forbidden:

- to modify the vehicle's standard fuel supply system,
- to drill the fuel tank to install an extra pick-off.



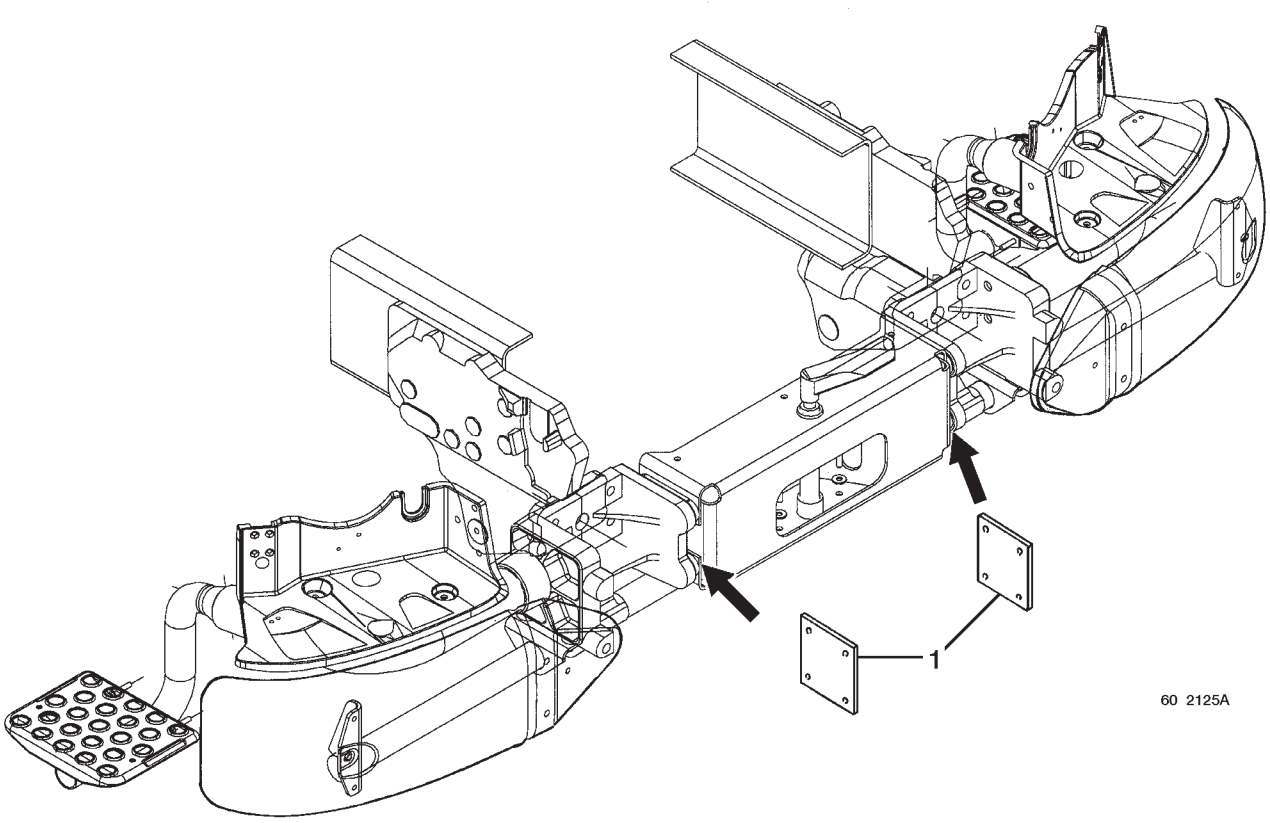
1 - engine suction
2 - engine return
3 - extra consumer suction
4 - extra consumer return
5 - fuel tank air vent

MANUFACTURER'S TECHNICAL RECOMMENDATIONS FOR SNOW CLEARING VEHICLES

14. SNOW CLEARING VEHICLE

14.1 Sheet metal bumper

To facilitate installation of the tool-holder plate, some MIDLUM versions (HD/Construction/4x4/18 tonnes Construction) are fitted with a sheet metal bumper. See that you order the tool-holder plate pre-arrangement option.
Use the shims (**1**) supplied only with the tool-holder pre-arrangement for installing the plates.



14.2 Signalling

To facilitate installation of the roof signalling system on the cab roof, you can order the roof gantry pre-arrangement (variant 46802: roof gantry and electrical power supply).

IMPORTANT
The gantry is a component that requires the presence of a stiffener welded as standard to the cab for its installation. This stiffener, located in an inaccessible zone, cannot be assembled as aftermarket fitment.

14.3 Hydraulic pump drive

To obtain the 3-groove pulley together with the accessories drive pulley, order the vehicle with variant 73410.

CHAPTER -C-
SUPPLEMENTARY INFORMATION ON THE “MIDLUM Euro 3” VEHICLE

1. MOUNTING OF POWER TAKE-OFFS

1.1 Mechanical receiver

To install a mechanical receiver, three layouts are possible:
- on gearbox-mounted PTO,
- on flywheel-mounted PTO,
- on crankshaft pulley.

1.1.1 Gearbox-mounted PTO

Table of possible gearbox-mounted PTO assemblies

Power take-off	Gearbox						
	ZF S5 – 42	EATON 4106 A/B	EATON 4106 OD	EATON 5206 A	EATON 6406 A	EATON 8209 A 8309 A	ALLISON MD 3060
ZF NS 42/2	X						
HYDROCAR 2264		X		X	X		
HYDROCAR 2903			X				
HYDROCAR 2904			X				
HYDROCAR 2903 + 2250 *			X				
HYDROCAR 2904 + 2250 *			X				
HYDROCAR 2266						X	
CHELSEA 276**							X

(*) PTO 2250 is installed on PTO 2903 or 2904 output N° 1.

(**) For continuous use.

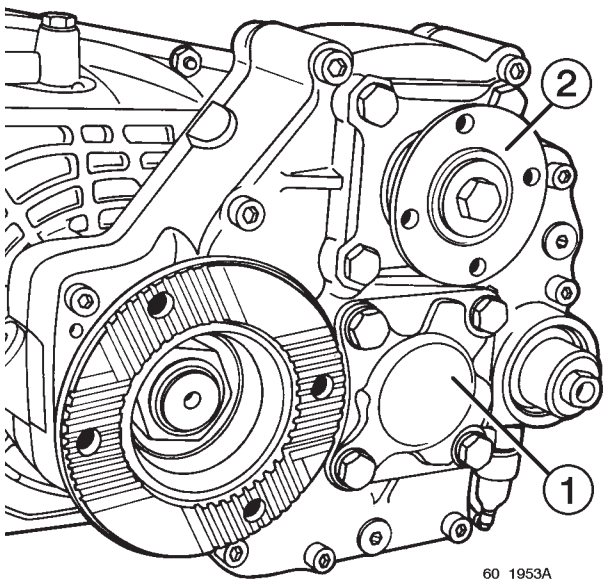
NOTE

The letter "**B**" or "**C**" added after the PTO type indicates the type of coupling mounted on the PTO output:
B - flange
C - splined shaft.

HYDROCAR 2903 & 2904 PTOs with two independent outputs

1 - Output N° 1: direct and full-time drive which can possibly be used. To control engagement, it is necessary to install an extra PTO (HYDROCAR 2250, 2264, 2266). The maximum torque transmissible by the unit is thus the lowest of the two PTOs.

2 - Output N° 2: stepped down drive with engagement control integrated in the PTO.



PTO characteristics

Type	Maximum output torque (Nm)	Maximum weight torque (Nm)	Direction of rotation	Drive ratio	Weight (kg)
NS 42/2	300		clockwise	0,87	11,5
2264		20	anticlockwise	0,84 (4106 A) 1 (4106 B) 1,48 (8209 A)	12
2903			clockwise	EATON 4106 A : Output n°2:1,9	16
2903	Output n°1 : 600 Output n°2 : 300		Output n°1: clockwise Output n°2: anticlockwise	EATON 4106 A : Output n°1:0,434 Output n°2:1,28	12
2903+2250				EATON 4106 B : Output n°1:0,517 Output n°2:1,52	15
2904	Output n°1 : 600 Output n°2 : 245			EATON 4106 A : Output n°1:0,434 Output n°2:1,49	12
2904+2250				EATON 4106 B : Output n°1:0,517 Output n°2:1,78	15
2266	400		anticlockwise	4106 A : 0,6 4106 B : 0,72 8209 A : 1,07	12
CHELSEA	285 (*) 400	90		1,03	

Maximum torques are given for a rotating speed at the PTO input of 1000 rpm and in temporary use.
(*) full-time use.

Flywheel-mounted PTO

Make: ZF
Type: NMV 130
- maximum output torque: maximum engine torque
- drive ratio: 1.03
- flange output only
- engagement by multi-plate clutch

Maximum torque transmissible by the PTO

$$P = \frac{C \times n \times \eta}{9550}$$

P: power (kW)
C: drive torque (Nm)
n: engine rotating speed (rpm)
η: PTO drive ratio

Frequency of use of PTOs

- Permanent use: Do not exceed half the maximum torque. In case of use at full power, it is essential to fit the PTO with a lubrication kit.
- Temporary use: The maximum operating time is 30 minutes, followed by a minimum stop time of 30 minutes (for cooling down).

ZF NMV 130 and CHELSEA 276 PTOs can be used continuously.
ZF NS 42/2 and HYDROCAR 2250, 2264, 2266, 2903, 2904 PTOs can be used temporarily.

PTO control: consult the vehicle driving and servicing handbook.
The maximum rotating speed of the PTO output shaft is 3000 rpm.

For any PTO modification (output shaft, lubrication kit), contact the manufacturer's commercial network.

1.2 Instructions for the assembly of auxiliary hydraulic pumps to ZF type “C” PTOs

Connection of the hydraulic pump must correspond to standard ISO 7653, type D.

1.2.1 Supplementary instructions

Fluidtight seal between pump and PTO

The seal between the pump and the PTO must be made by two gaskets (**J1 & J2**) and an air drain between the gaskets (**E**).

IMPORTANT
The air drain (E) must guarantee that the gearbox oil is not aspirated and the hydraulic oil does not penetrate inside the gearbox.

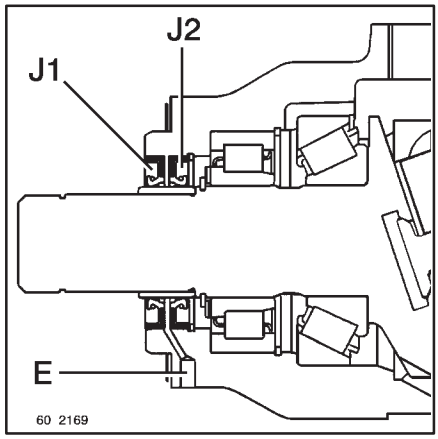
The gaskets must be capable of withstanding temperatures reaching as high as 120°C.

The gasket (**J1**), fitted on the PTO side, must guarantee fluidtightness of the gearbox filled with oil specified by the manufacturer.

The gasket (**J2**), fitted on the pump side, must guarantee fluidtightness of the pump containing hydraulic oil.

Correct operation of the air drain must be guaranteed at all times (do not paint it, blank it off or let it become fouled).

IMPORTANT
In the event of oil leakage through (E), the entire system must be immediately checked out.



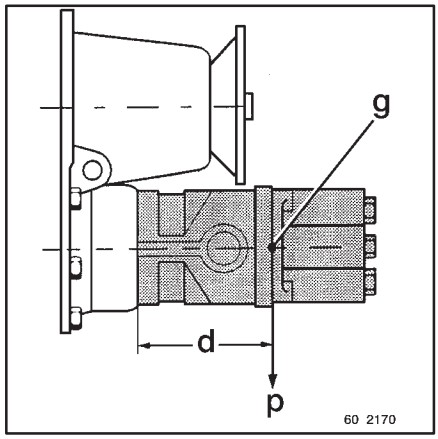
Calculation of the weight torque

In the event of direct assembly of a hydraulic pump or another receiver (**2**) on the PTO (**1**) (see chapter C-1.1.1), the weight torque should not exceed the value given in the PTOs characteristics table. Overstepping this value may lead to fast damage to the PTO or the gearbox.

Calculation method

$$Cp = P \times d$$

Cp : weight torque (Nm)
P : pump weight (N)
d : distance separating PTO contact face from the vertical passing through the centre of gravity (g) of the pump



2. AIR-OPERATED EQUIPMENT

2.1 Connection of extra auxiliary equipment

The addition of extra auxiliary equipment not planned by the manufacturer must without fail be connected to the specific auxiliary equipment circuit.

The compressed air consumption of this auxiliary equipment should in no way compromise the braking circuit filling times laid down by the legislation in force.

The extra piping must be routed on the LH inner side of the chassis. Ensure fastening using nylon clamps.

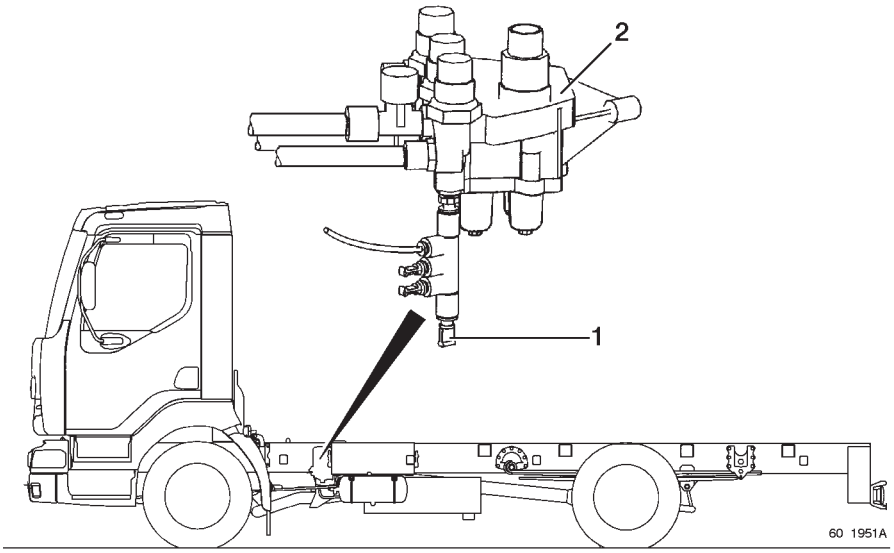
If the vehicle is equipped with an electric retarder, route the piping in a heat shield.

For any further information, consult the RENAULT V.I. Commercial Sales department.

2.1.1 Coupling for extra auxiliary equipment to chassis

There is a coupling for the connection of extra auxiliary equipment to the chassis provided on vehicles with a "Trade pack" or a power take-off:
- road sweeper,
- refuse collector,
- "Trade pack" (crane, tipper, tail lift...) pre-arrangement.

A "multiple T" snap-on coupling, diameter 6 mm, closed by a blanking plug (1) is arranged on the manometric block (2) in the vicinity of the air dryer.



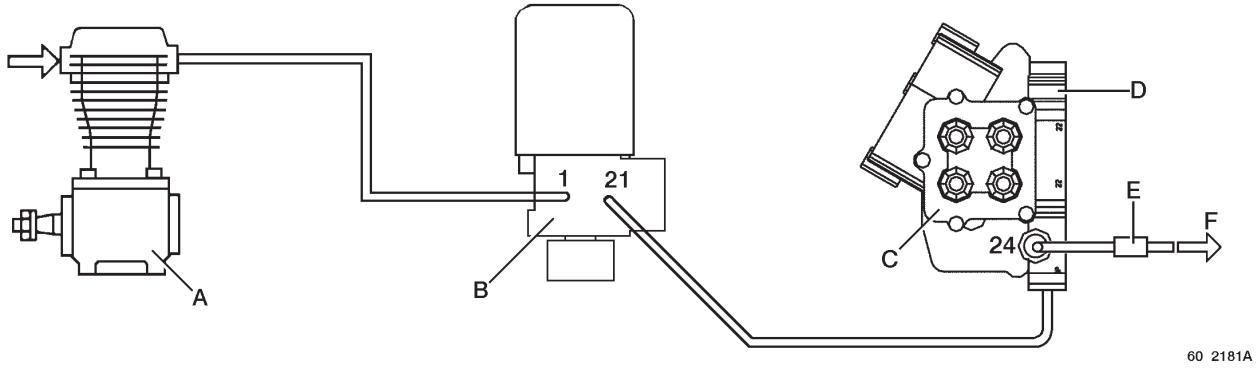
For pneumatic connection on-vehicle not provided with coupling, hook up to the auxiliary equipment circuit (brown coloured mark) close to the air dryer.

Use snap-on couplings for connection:
- "**Y**" coupling diameter 6 mm ref. N° 50.05.330.278
- "**T**" coupling diameter 6 mm ref. N° 50.05.330.159.

The additional circuit should not cause any mechanical stress to the bracket.

Connection diagram

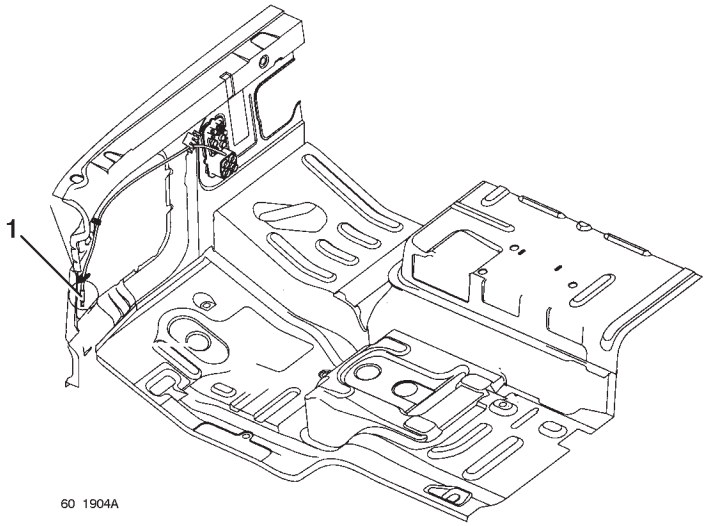
A - Compressor
B - Air dryer
C - Four-way protection valve
D - Manometric block
D - Brown coloured ring
F - To auxiliary equipment (presence of a “multiple T” for vehicles with “Trade pack” or PTO)



2.1.2 Coupling for extra auxiliary equipment in cab

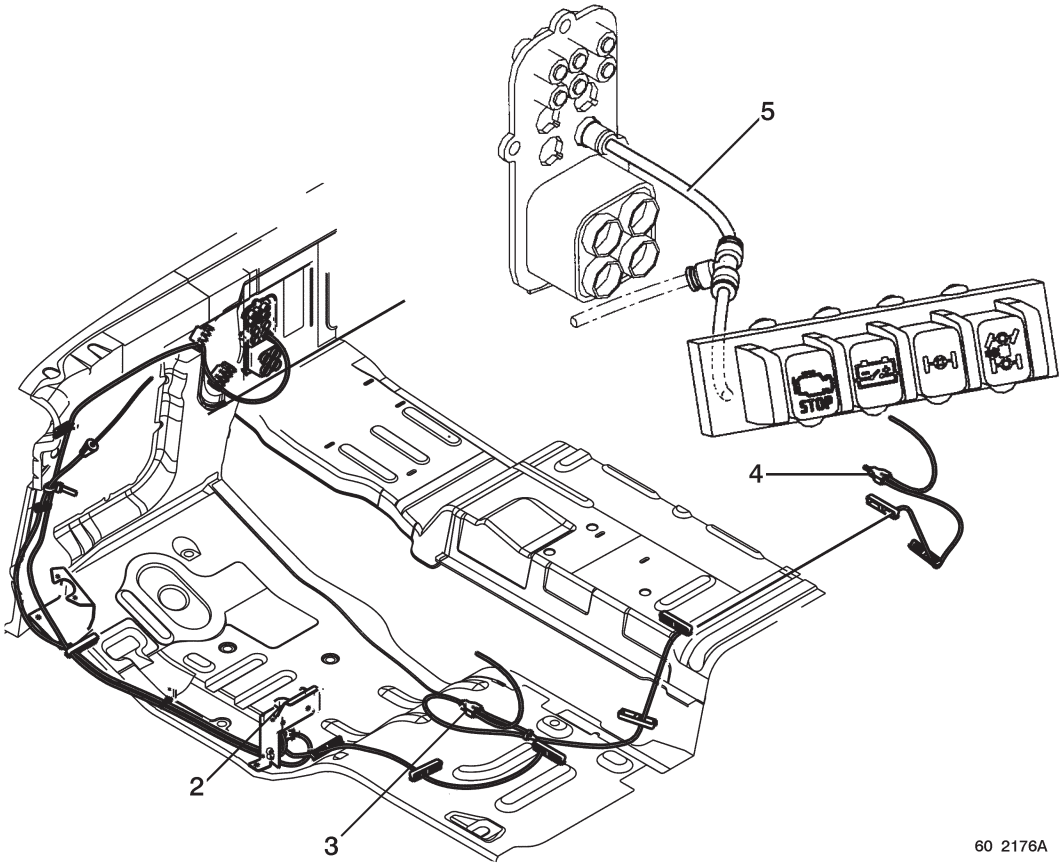
Cab not equipped with air-operated appliances

An available pneumatic feed fitted with a 6 mm snap-on coupling at its end stopped up by a blanking plug (1) is located on the LH inner face of the dash cowl.



Cab equipped with air-operated appliances

Install on the cab auxiliary equipment feed circuit a snap-on “T” or “Y” coupling diameter 6 mm.
Routing of auxiliary equipment circuit in cab:
- Steering column lock (**2**),
- Air suspension seat(s) (**3-4**),
- Chassis pneumatic controls (**5**) (PTO, differential dog clutch),
- “Y” snap-on coupling diameter 6 mm, ref. N° 50.05.330.278,
- “T” snap-on coupling diameter 6 mm, ref. N° 50.05.330.159.



2.2 Table of compressors

According to vehicle equipment

Compressor displacement	Duty pressure	Compressor output at duty pressure according to rotating speed		
		1000 rpm	1500 rpm	2000 rpm
single cylinder 150 cc	9,5 bar	87 l/min	132 l/min	176 l/min
twin cylinder 250 cc		130 l/min	212 l/min	285 l/min

Compressor drive ratio: 1.03

3. ELECTRICS

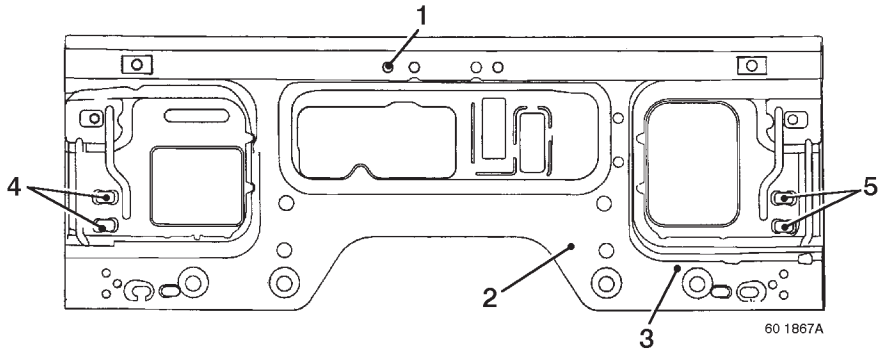
3.1 Earths

3.1.1 Cab earths

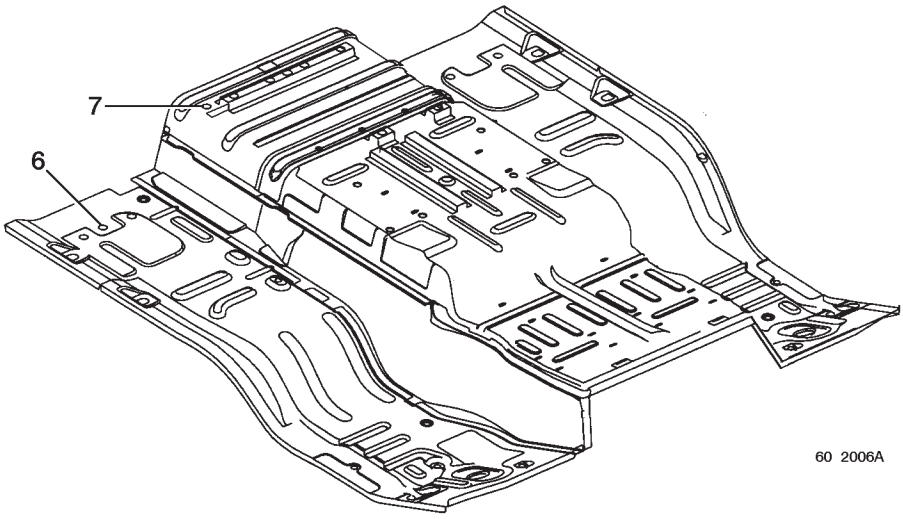
Cab fastenings are by means of M6 stainless steel studs welded to the cab.

Door earths
On light fire tender only:
- earth braids meeting the fire brigade standard are installed on all the doors.

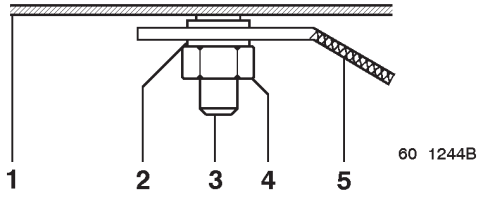
Front end earths
Cab exterior:
1 - heated windscreen earth stud
2 - chassis earth braid stud (RH drive vehicles)
3 - chassis earth braid stud (LH drive vehicles)
Cab interior:
4 - cab earth (LH drive vehicles)
5 - cab earth (LH drive vehicles)



Cab floor earths
6 - independent heating earth on sleeper cab (on RH rear floor)7 - earth (on engine tunnel)



Fastening of earth lug or braid to cab
1 - Front end panel
2 - Stainless steel washer diameter 6 mm
3 - Front end M6 stainless steel stud
4 - M6 stainless steel nut
5 - Earth lug or braid
Nut (**4**) tightening torque: 9 ± 1 Nm



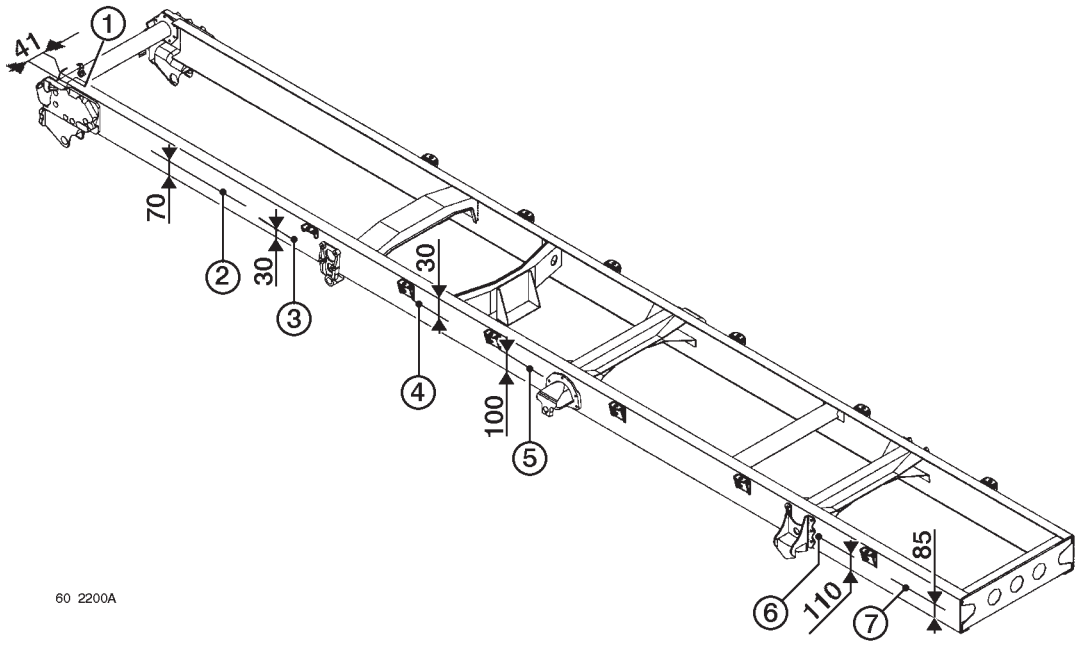
3.1.2 Chassis earths

All chassis earths are on the LH sidemember via 11 mm diameter holes.
1 - cab earth
2 - starter earth
3 - fuel preheater earth
4 - batteries earth
- automatic transmission earth (ALLISON MD 3060)
- trailer socket earth

5 - rear wiring harness earth
- electric retarder earth

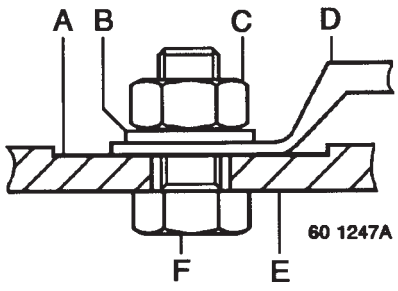
6 - tail lift installation earth (standard fitment stainless steel threaded hardware)
7 - trailer socket earth (drawbar rigid vehicles)

Apart from the battery and cab earths located to the outside of the chassis, all the earths are fastened to the inside of the sidemember.



Assembly to electrical earth points diameter 11 mm

A - spotface diameter 30 mm
B - plain stainless steel washer diameter 10 mm
C - stainless steel nut Hx150
D - earth lug or braid
E - sidemember
F - stainless steel screw M10x150.
Tightening torque: 45 ± 9 Nm.



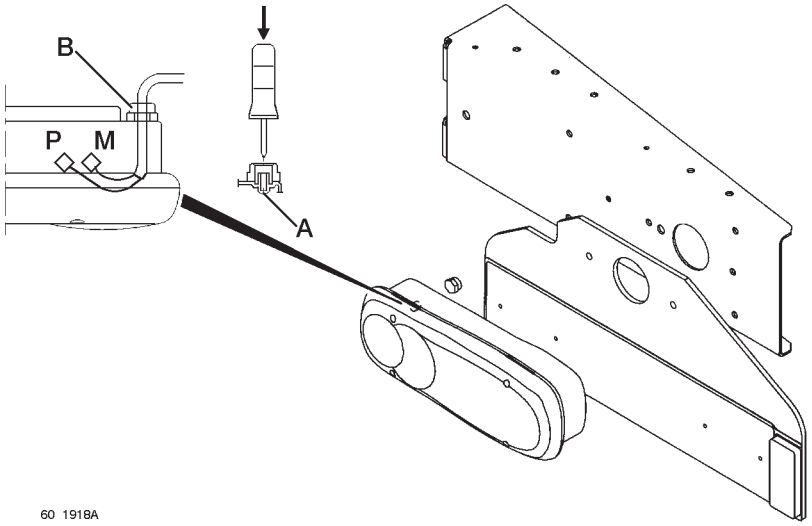
Some equipment items need connection of the earth to a point other than the originally planned earths. In such case, use any free drilling (13 mm diameter). Make a spotface to give anti-corrosion protection by means of tin-coating or a zinc aerosol spray prior to assembly. Use 12 mm stainless steel threaded hardware.

Zinc aerosol paint spray ref. N° 77.01.406.425 available from the RENAULT V.I. Spare Parts department.

3.2 Hook-up of lateral lamps to the rear lamp (vehicle with rear lighting bar, without variant 155 02 & 155 03)

Make a small opening at point (**A**) on the rear lamp.
Cut the 2-way connector of the lateral signalling lamp.
Engage the wiring harness in the rear lamp and connect the wires to the available terminals in the rear lamp:
- brown wire to earth (terminal "**M**"),
- blue wire to side/parking lamps power supply (terminal "**P**").

At point (**A**), fit the stuffing box and tightening nut (**B**) supplied in the installation kit on the wiring harness to the rear lamp.
Make an undercut in the rear lamp bracket to allow passage of the additional wiring harness.



For safety reasons, it is recommended to cross over the wiring harnesses connecting the lateral lamps:
- RH signalling connected to the LH rear lamp
- LH signalling connected to the RH rear lamp

3.3 Hook-up in front end connection zone (vehicles without "bodybuilder pack" and refuse collectors)

Cut the 2-way JPT connector on the wiring harness of a lateral lamp and crimp each wire with a JPT clip ref. N° 50 10 214 346.
In the front end connection zone:
Clip the two wires in the 8-way connector if present on the vehicle - if not, clip the wires to a connector ref. N° 50 10 214 495 and hook up the assembly in the connection zone.
Position the wires on the 8-way connector:
- terminal 2: lighting power supply
- terminal 1: earth.

Connect the other signalling lamps in festoon fashion.

The lateral lamps wiring harness must follow the routing of the other wiring harnesses and allow tilting of the cab without causing any damage.

Procurement:
- 8-way connector (hook-up on front end) ref. N° 50 10 214 495
- electrical clips ref. N° 50 10 214 345

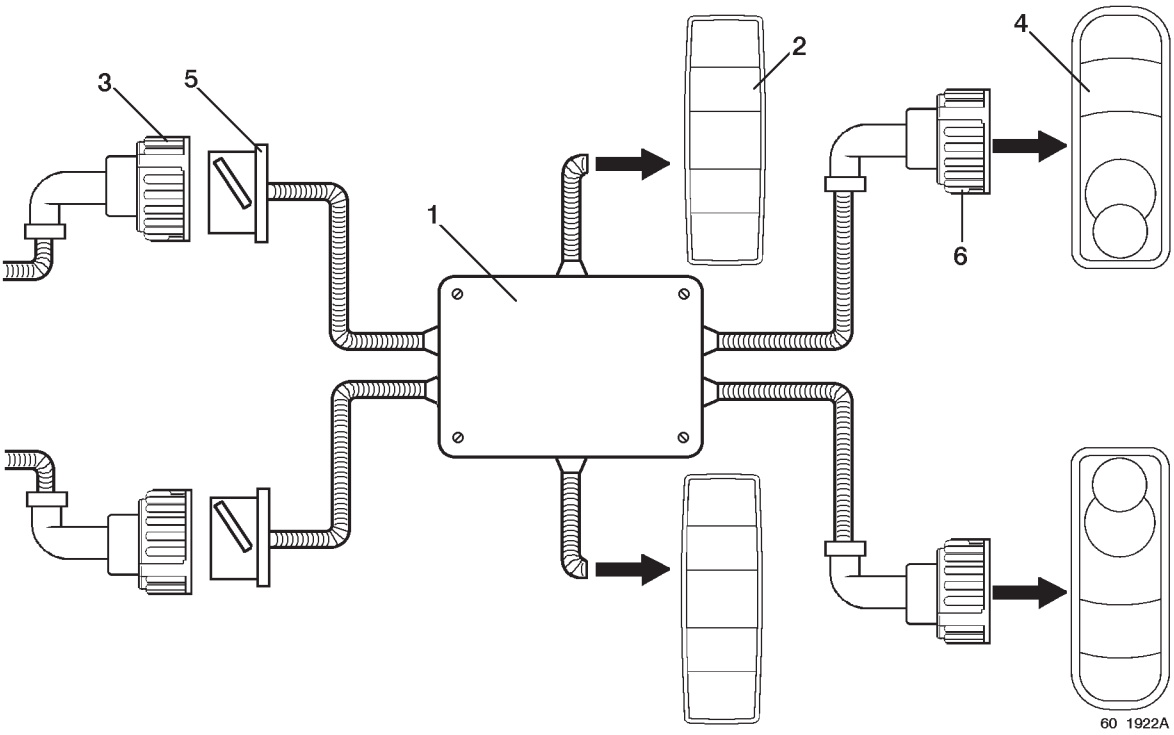
3.4 Changing the position of vehicle rear lamps

Rear lamps mounted in series on lighting bar and on run-under guard are officially approved in the horizontal or vertical position.
If the lamp is mounted in the vertical position, the lens gasket must be repositioned so that the slot (junction between the two ends of the seal) is facing downwards.

3.5 Doubling up the rear lamps

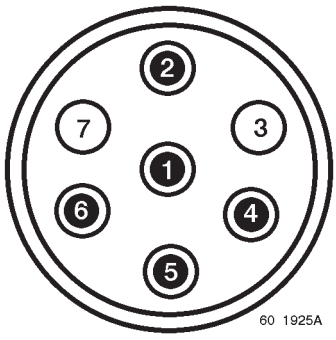
It is possible to install two additional rear lamps by inserting a junction box between the existing rear lamps and their wiring harness. Each additional rear lamp must be connected in parallel with a vehicle lamp.

Key
1 - Junction box
2 - Additional lamps
3 - Vehicle wiring harness
4 - Vehicle rear lamps
5 - Junction box connectors to vehicle wiring harness
6 - Junction box connectors to rear lamps



Assignment of connector terminals

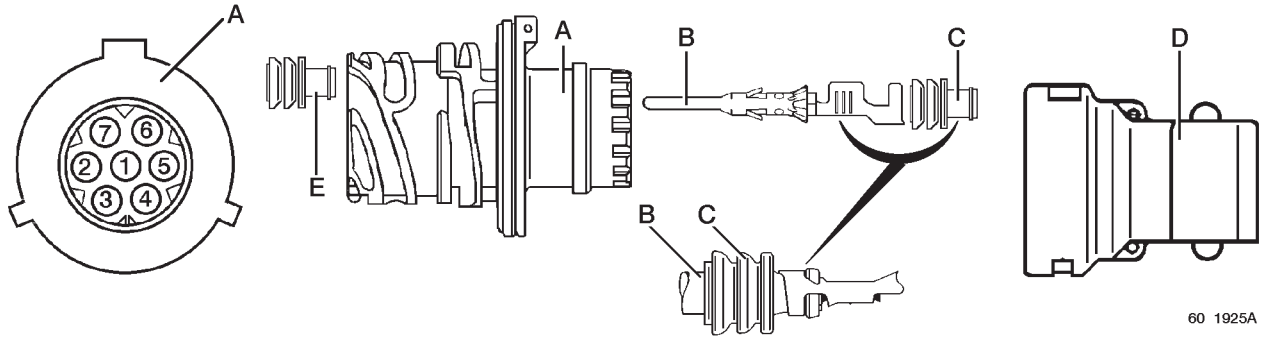
Terminal	Function	
	LH connector	RH connector
1	earth	earth
2	LH side/parking lamp	LH side/parking lamp
3	not assigned	reversing lamp
4	LH flashing lamp	RH flashing lamp
5	LH stop lamp	RH stop lamp
6	fog lamp	braking information
7	not assigned	not assigned

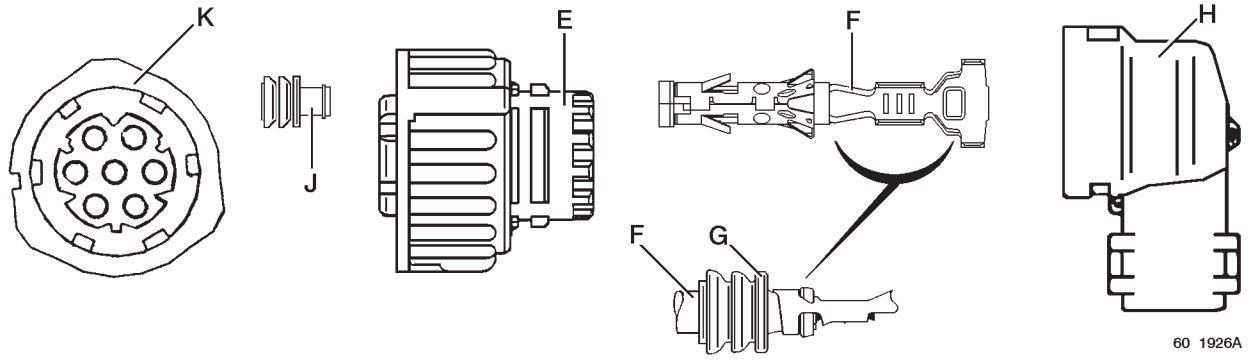


Procurement
Connector (**5**):
A - 7-way pin-holder box ref. N° 50 10 306 943
B - 1 mm2 pin ref. N° 50 10 306 944
C - 1 mm2 wire grommet seal ref. N° 50 10 214 624
D - straight adapter ref. N° 50 10 306 096
E - blanking plug ref. N° 50 10 241 931

Connector (**6**):
K - 7-way socket-holder box ref. N° 50 10 306 490
F - 1 mm2 socket ref. N° 50 10 306 491
G - 1 mm2 wire grommet seal ref. N° 50 10 214 624
H - elbow adapter ref. N° 50 10 306 097
J - blanking plug ref. N° 50 10 214 931

Blanking plugs (**E-J**) are to be installed without fail in the ways of pin-holder (**A**) and of socket-holder (**K**) that are not provided with wires (terminal 7). They give a fluidtight seal to the connector.
Use the 10 mm diameter ringed sheath and position it in the immobilization grooves of the adapters (**D-H**) before crimping them.





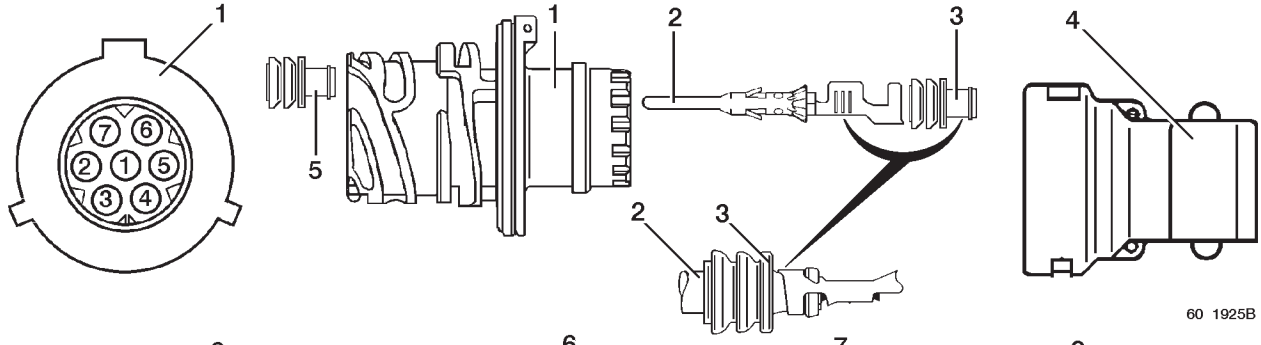
3.6 Extension of the wiring harness

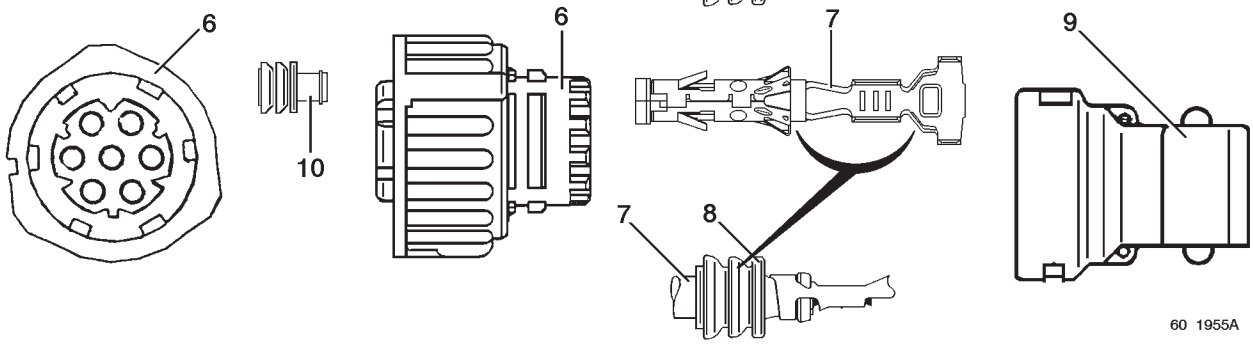
If the chassis is elongated, it may be necessary to extend the vehicle wiring harness.
For this operation, section the harness and insert an electrical extension.
The cables of this extension must without fail be of a cross-section identical to that of the corresponding cable on the vehicle. The maximum amperage passing through each cable should be no greater than 5 Amps/mm2.
Use one or several connectors recommended hereafter. The pins or sockets should be adapted to the cable cross-sections on which they are mounted.

Procurement:

1 - 7-way pin-holder box ref. N° 50 10 306 943
2 - 1 mm^2 pin ref. N° 50 10 306 944
2 - 2.5 mm^2 pin ref. N° 50 10 306 945
3 - 1 mm^2 wire grommet seal ref. N° 50 10 214 624
4 - straight adapter ref. N° 50 10 306 096
5 - blanking plug ref. N° 50 10 241 931
6 - 7-way socket-holder box ref. N° 50 10 306 490
7 - 1 mm^2 socket ref. N° 50 10 306 491
7 - 2.5 mm^2 socket ref. N° 50 10 306 494
8 - 1 mm^2 wire grommet seal ref. N° 50 10 214 624
9 - elbow adapter ref. N° 50 10 306 097
10 - blanking plug ref. N° 50 10 214 931

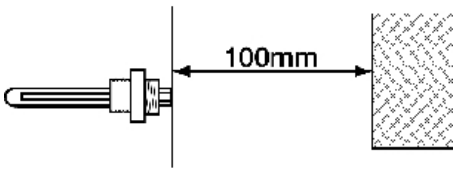
Blanking plugs (**5-10**) are to be installed without fail in the ways of pin-holder (**1**) and of socket-holder (**6**) that are not provided with wires. They give a watertight seal to the connector.
Use the 10 mm diameter ringed sheath and position it in the immobilization grooves of the adapters (**4-9**) before crimping them.





3.7 Assembly of the immersion heater

If the height of the sub-frame is less than 150 mm, provide a free space of at least 100 mm behind the immersion heater for removal purposes.
Do not knock the electrical connection during bodybuilding.



60 2238A

4. CHASSIS

4.1 Steel classes for sidemembers

Sidemembers are cascade down into two classes of steel (chapter A-2.1.4):
- class F for a minority of cases (identified by an asterisk (*) in the table below).
- class D for all other cases.

4.2 Sections of sidemembers

MIDLUM B

<table>
<tr><th rowspan="2">GVW (tonnes)</th><th rowspan="2">Wheelbase (mm)</th><th colspan="3">Sidemember section</th></tr>
<tr><th>2-door cab mechanical suspension</th><th>2-door cab air suspension</th><th>4-door cab</th></tr>
<tr><td rowspan="6">7.5</td><td>2700</td><td rowspan="6">200 x 70 x 5</td><td rowspan="2"></td><td></td></tr>
<tr><td>2950</td><td rowspan="4">200 x 70 x 7</td></tr>
<tr><td>3250</td></tr>
<tr><td>3850</td><td>200 x 70 x 5</td></tr>
<tr><td>4450</td><td rowspan="2">200 x 70 x 6</td></tr>
<tr><td>5050</td><td></td></tr>
<tr><td rowspan="6">10</td><td>2700</td><td rowspan="3">200 x 70 x 5</td><td rowspan="3"></td><td></td></tr>
<tr><td>2950</td></tr>
<tr><td>3250</td><td rowspan="4">200 x 70 x 7</td></tr>
<tr><td>3850</td><td rowspan="3">200 x 70 x 6</td><td>200 x 70 x 6</td></tr>
<tr><td>4450</td><td rowspan="2">200 x 70 x 7</td></tr>
<tr><td>5050</td><td></td></tr>
<tr><td rowspan="5">12</td><td>2950</td><td rowspan="2">200 x 70 x 5</td><td rowspan="2"></td><td rowspan="5"></td></tr>
<tr><td>3250</td></tr>
<tr><td>3850</td><td rowspan="3">200 x 70 x 6</td><td rowspan="3">200 x 70 x 7 (*)</td></tr>
<tr><td>4450</td></tr>
<tr><td>5050</td></tr>
</table>

MIDLUM C'

<table>
<tr><th rowspan="2">GVW (tonnes)</th><th rowspan="2">Wheelbase (mm)</th><th colspan="3">Sidemember section</th></tr>
<tr><th>2-door cab mechanical suspension</th><th>2-door cab air suspension</th><th>4-door cab</th></tr>
<tr><td rowspan="8">12</td><td>3070</td><td rowspan="6">220 x 70 x 5</td><td rowspan="2"></td><td></td></tr>
<tr><td>3350</td><td rowspan="5">220 x 70 x 7</td></tr>
<tr><td>3650</td><td rowspan="2">220 x 70 x 6</td></tr>
<tr><td>3950</td></tr>
<tr><td>4550</td><td rowspan="2">220 x 70 x 7</td></tr>
<tr><td>5150</td><td>220 x 70 x 6</td></tr>
<tr><td>5750</td><td rowspan="2">220 x 70 x 7</td><td rowspan="2">220 x 70 x 8 (*)</td><td rowspan="2"></td></tr>
<tr><td>6480</td></tr>
</table>

MIDLUM C

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
11–12	3070	220 x 70 x 5		
	3350			220 x 70 x 7
	3650		220 x 70 x 6	
	3950			
	4550		220 x 70 x 7	
	5150	220 x 70 x 6		
	5750	220 x 70 x 7	220 x 70 x 8 (*)	
	6480			
13–14	3070	220 x 70 x 6		
	3350			220 x 70 x 8 (*)
	3650		220 x 70 x 7	
	3950			
	4550	220 x 70 x 7		
	5150		220 x 70 x 8 (*)	
	5750	220 x 70 x 8 (*)		
	6480			
15–16	3070	220 x 70 x 7		
	3350			
	3650		220 x 70 x 7	220 x 70 x 8 (*)
	3950			
	4550			
	5150	220 x 70 x 8 (*)	220 x 70 x 8 (*)	
	5750			
	6480			

MIDLUM D & D Construction**

GVW (tonnes)	Wheelbase (mm)	Sidemember section	
		2-door cab mechanical suspension	2-door cab air suspension
18	3650 **	244 x 70 x 7(*)	244 x 70 x 7(*)
	3950 **		
	4250 **		
	4550 **		
	4850		
	5150		
	5450	244 x 70 x 8(*)	244 x 70 x 8(*)
	5750		
	6050		
	6480		
	6780		

MIDLUM HD/Construction

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
12–13–14	3070	220 x 70 x 7		220 x 70 x 7
	3350			
	3650			
	3950			
	4550			
15–16	3070	220 x 70 x 8 (*)		220 x 70 x 8 (*)
	3350			
	3650			
	3950			
	4550			

MIDLUM 4x4

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
TA 12–13–14	3070	220 x 70 x 7		220 x 70 x 7
	3350			
	3650			
	3950			
TC 15–16	3070	220 x 70 x 8 (*)		220 x 70 x 8 (*)
	3350			
	3650			
	3950			

Trade vehicles

Vehicle	GVW (tonnes)	Wheelbase (mm)	Sidemember section
Tanker	16	3350	220 x 70 x 7
		3650	
		3950	
Tanker	18	3650	244 x 70 x 7 (*)
		3950	
		4250	
		4550	
Refuse collector	16	3070	220 x 70 x 7
		3350	
		3650	
Tractor	16	3650	
Road sweeper	10/12	3070	220 x 70 x 5
		3350	
	15	3350	220 x 70 x 7
		3650	
		3950	

4.3 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 V.I. (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 V.I. Product Applications Department for any further information or to get a list of sales outlets marketing such sections.

4.3.1 Modification to the rear overhang

In the event of extension of the rear overhang, take into consideration the regulations in force and in particular the overhang / wheelbase ratio and recommendations of the bodybuilders guide.

4.3.2 Modification to the wheelbase

For a given vehicle, the section and class of steel for sidemembers depend on:
- GVW,
- suspension type (air or mechanical),
- cab,
- wheelbase.

The maximum extended wheelbase length is that of the largest wheelbase on the same vehicle (same GVW, cab, suspension) fitted with sidemembers of identical section. It is strictly forbidden to overstep this limit.
Vehicles having the maximum permitted length for a given sidemember section cannot therefore have their wheelbase extended.

MIDLUM B

<table>
<tr><th rowspan="2">GVW (tonnes)</th><th rowspan="2">Wheelbase (mm)</th><th colspan="3">Sidemember section</th></tr>
<tr><th>2-door cab mechanical suspension</th><th>2-door cab air suspension</th><th>4-door cab</th></tr>
<tr><td rowspan="7">7.5</td><td>2700</td><td rowspan="5">5050</td><td rowspan="2"></td><td></td></tr>
<tr><td>2950</td><td rowspan="2">4550</td></tr>
<tr><td>3250</td><td rowspan="2"></td></tr>
<tr><td>3850</td><td>extension forbidden</td></tr>
<tr><td>4450</td><td>5050</td><td>extension forbidden</td></tr>
<tr><td>5050</td><td>extension forbidden</td><td>extension forbidden</td><td></td></tr>
<tr><td rowspan="6">10</td><td>2700</td><td rowspan="2">3250</td><td rowspan="3"></td><td></td></tr>
<tr><td>2950</td><td rowspan="4">4550</td></tr>
<tr><td>3250</td><td>extension forbidden</td></tr>
<tr><td>3850</td><td rowspan="2">5050</td><td>extension forbidden</td></tr>
<tr><td>4450</td><td>5050</td></tr>
<tr><td>5050</td><td>extension forbidden</td><td>extension forbidden</td><td>extension forbidden</td></tr>
<tr><td rowspan="5">12</td><td>2950</td><td>3250</td><td rowspan="2"></td><td rowspan="5"></td></tr>
<tr><td>3250</td><td>extension forbidden</td></tr>
<tr><td>3850</td><td rowspan="2">5050</td><td rowspan="2">5050</td></tr>
<tr><td>4450</td></tr>
<tr><td>5050</td><td>extension forbidden</td><td>extension forbidden</td></tr>
</table>

MIDLUM C'

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
12	3070	4550		
	3350			5150
	3650		3950	
	3950		extension forbidden	
	4550	extension forbidden	5150	
	5150		extension forbidden	extension forbidden
	5750	6480	6480	
	6480	extension forbidden	extension forbidden	

MIDLUM C

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
11–12	3070	4550		
	3350			5150
	3650		3950	
	3950		extension forbidden	
	4550	extension forbidden	5150	
	5150		extension forbidden	extension forbidden
	5750	6480	6480	
	6480	extension forbidden	extension forbidden	
13–14	3070	3950		
	3350			5150
	3650		4550	
	3950	extension forbidden		
	4550	5150	extension forbidden	
	5150	extension forbidden	6480	extension forbidden
	5750	6480		
	6480	extension forbidden	extension forbidden	
15–16	3070	4550		
	3350			
	3650		4550	5150
	3950			
	4550	extension forbidden	extension forbidden	
	5150	6480	6480	extension forbidden
	5750			
	6480	extension forbidden	extension forbidden	

MIDLUM D

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
18	3650	5150	5150	
	3950			
	4250			
	4550			
	4850			
	5150	extension forbidden	extension forbidden	
	5450	6780	6780	
	5750			
	6050			
	6480			
	6780	extension forbidden	extension forbidden	

MIDLUM D construction

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
18	3650	4550	4550	
	3950			
	4250			
	4550	extension forbidden	extension forbidden	

MIDLUM HD/construction

GVW (tonnes)	Wheelbase (mm)	Sidemember section		
		2-door cab mechanical suspension	2-door cab air suspension	4-door cab
12–13 14–15 16	3070	4550		4550
	3350			
	3650			
	3950			
	4550	extension forbidden		extension forbidden

Trade vehicles

Vehicle	GVW (tonnes)	Wheelbase (mm)	Sidemember section
Tanker	16	3350	3950
		3650	
		3950	extension forbidden
Tanker	18	3650	4550
		3950	
		4250	
		4550	extension forbidden
Refuse collector	16	3070	3650
		3350	
		3650	extension forbidden
Tractor	16	3350	extension forbidden
Road sweeper	10/12	3070	3350
		3350	extension forbidden
	15	3350	3950
		3650	
		3950	extension forbidden

4.4 Intermediate crossmember

After extension to the rear overhang or the wheelbase:
The fitting of an intermediate crossmember or relay crossmember is vital if the number of crossmembers in the extended vehicle is less than those for the corresponding standard vehicle.
It is therefore essential to consult the 1/20th scale bodybuilder's drawing for the vehicle with lesser or equal wheelbase so as to find out which crossmembers are to be added.

Note
The crossmember that may have to be added will be different depending on the place where the sidemember is sectioned for the purpose of extension. It is therefore strongly advised, before proceeding with cutting, to determine:
- if there is any need to add a crossmember,
- the point where the fitting of the crossmember will be the easiest (e.g. fitting of a simple crossmember rather than a relay crossmember). Consult the RENAULT V.I. Product Applications Department.

Procurement
On account of the diversity of assemblies, consult the RENAULT V.I. Product Applications Department to find out the reference number and position of the crossmember to be added.
Threaded hardware to be used for fastening crossmembers to chassis:
- collar bolt HM12x125x40 class 10.9
- flanged locknut DRH M12.
Tighten to torque.

5. CHANGING THE POSITION OF EQUIPMENT ON CHASSIS

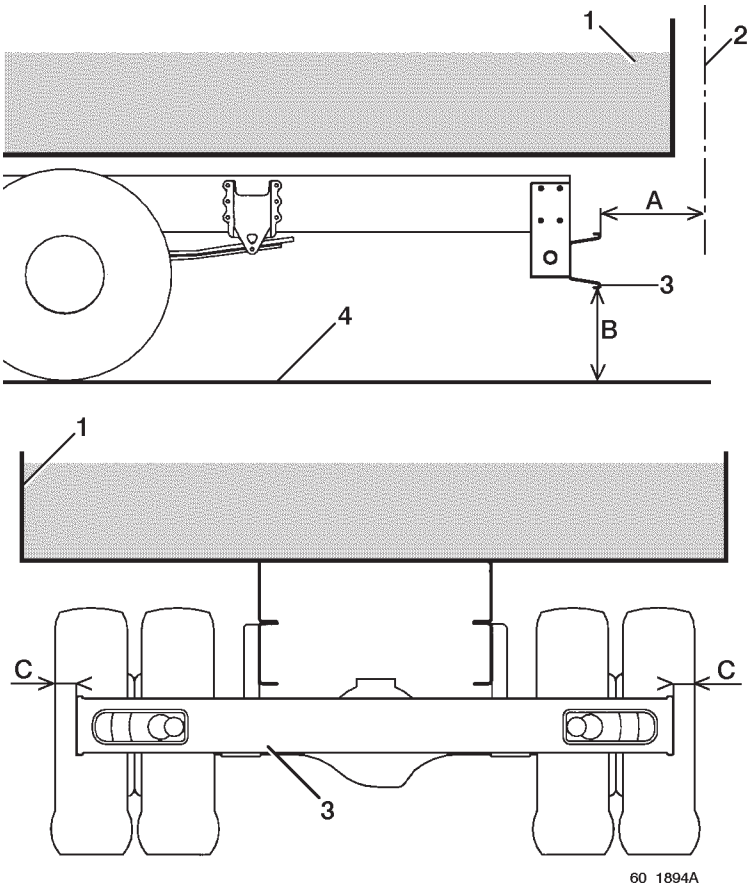
Depending on the vehicle's equipment, drillings existing in the web of sidemembers make it possible to change the position of: rear run-under guard, rear lighting bar, towing crossmember.
Apart from cutting the sidemember, this modification is made without converting the chassis.

5.1 Rear run-under guard

Whatever the position of the rear run-under guard in relation to the chassis, distances (A) and (B) are to be observed without fail.
1 - Body
2 - Body rear overall (including mountings, hinges...)
3 - Run-under guard
4 - Ground
The thickness of mountings and hinges should not exceed 120 mm (distance between centre-line (2) and the rear face of the body).

Vehicle	GVW	A (mm)	B (mm)	C (mm)
MIDLUM B	7.5	250	550	C < 100
	10	375		
	12	250		
MIDLUM C/C'	12	230		
	14			
	16			
MIDLUM HD/Construction	14	219		
	16			
MIDLUM D	18			

A - maximum distance separating the run-under guard to the body rear overall
B - maximum height of run-under guard in relation to ground, vehicle unladen



5.2 Changing the position of the rear run-under guard

The rear run-under guard can be displaced horizontally owing to the presence of drillings in the sidemembers and vertically owing to drillings in its brackets (see drawings on following pages).

Table of possible vertical positionings

Vehicle	Number of position	Maximum movement (mm)	Pitch (mm)
MIDLUM B	2	25	25
MIDLUM C'/C	3	50	
MIDLUM D			
MIDLUM Construction			

The rear run-under guard must be fastened with threaded hardware with dimensions and quality identical to the original. Tighten to torque.

5.3 Changing the position of rear lighting bar lamps

The position of rear lighting bar lamps can be moved horizontally owing to the presence of drillings in the side-members.
The rear lighting bar lamps must be fastened with threaded hardware with dimensions and quality identical to the original. Tighten to torque.

Note:
For vehicles MIDLUM C'/C/D/HD/Construction vehicles, the rear lighting bar lamps can be fastened to the rear spring hangers (tractor version assembly). This assembly requires the use of appropriate parts (see chapter B-5.5).

5.4 Changing the position of the towing crossmember

The position of the towing crossmember can be moved horizontally owing to the presence of drillings in the sidemembers.
The towing crossmember must be fastened with threaded hardware with dimensions and quality identical to the original.
Tighten to torque.

Table of possible horizontal positionings

Vehicle	E	A	D	Z
MIDLUM B 2-door cab	2700	35	630	1515
	2950	35	770	1675
	3250	35	980	1870
	3850	35	1330	2260
	4450	35	1680	2665
	5050	35	1820	3040
MIDLUM B 4-door cab	3250	35	840	1870
	3850	35	1190	2260
	4450	35	1610	2665
	5050	35	1750	3040
MIDLUM Fire Tender 10 tonnes 4-door cab	3250	35	840	1870

Key to diagrams on following pages:
a - High position
b - Low position
W - Maximum vertical displacement
X - Rear axle centre-line
Z - Maximum overhang
1 - Run-under guard
2 - Lighting bar lamps
3 - Towing crossmember

MIDLUM B

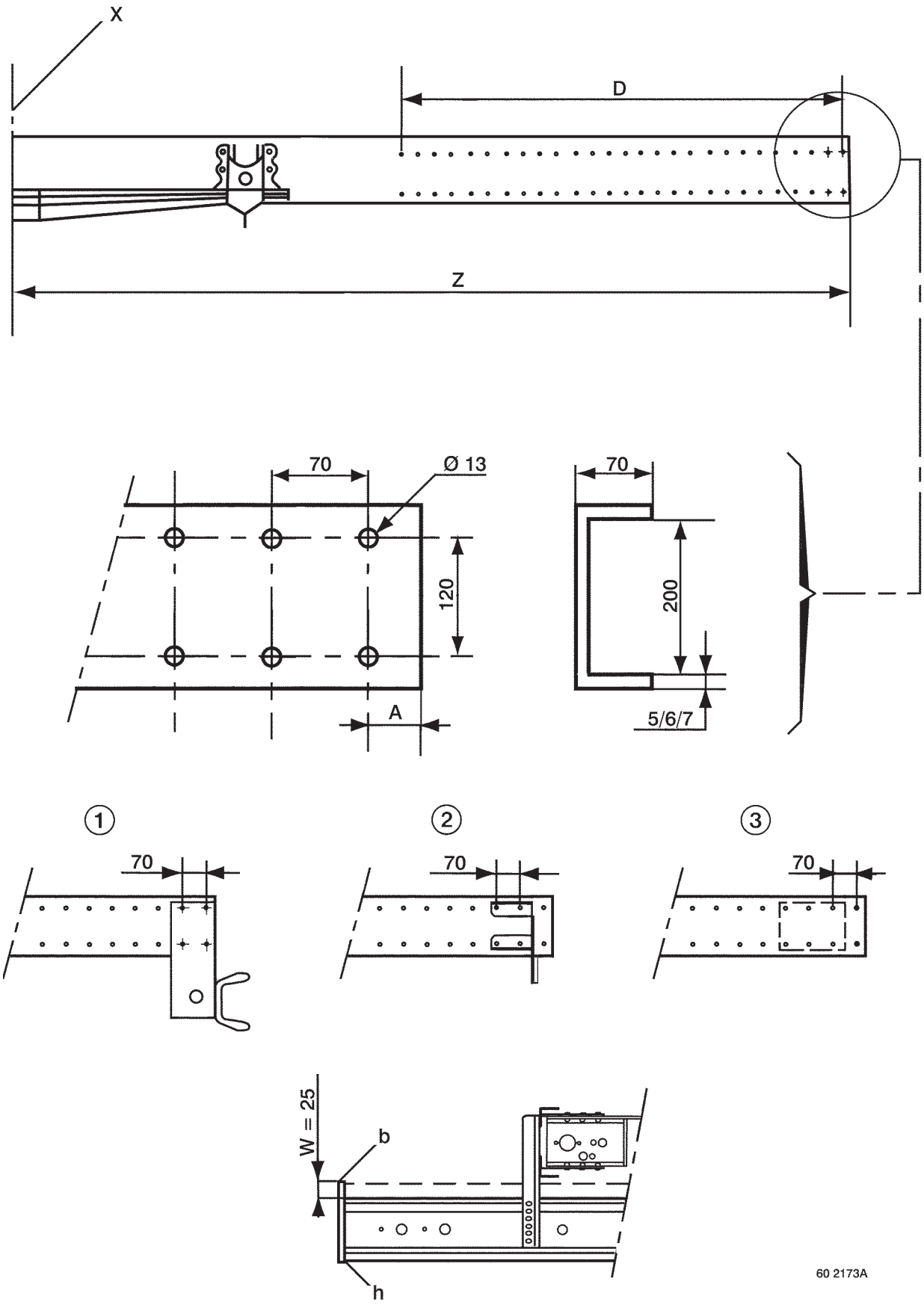
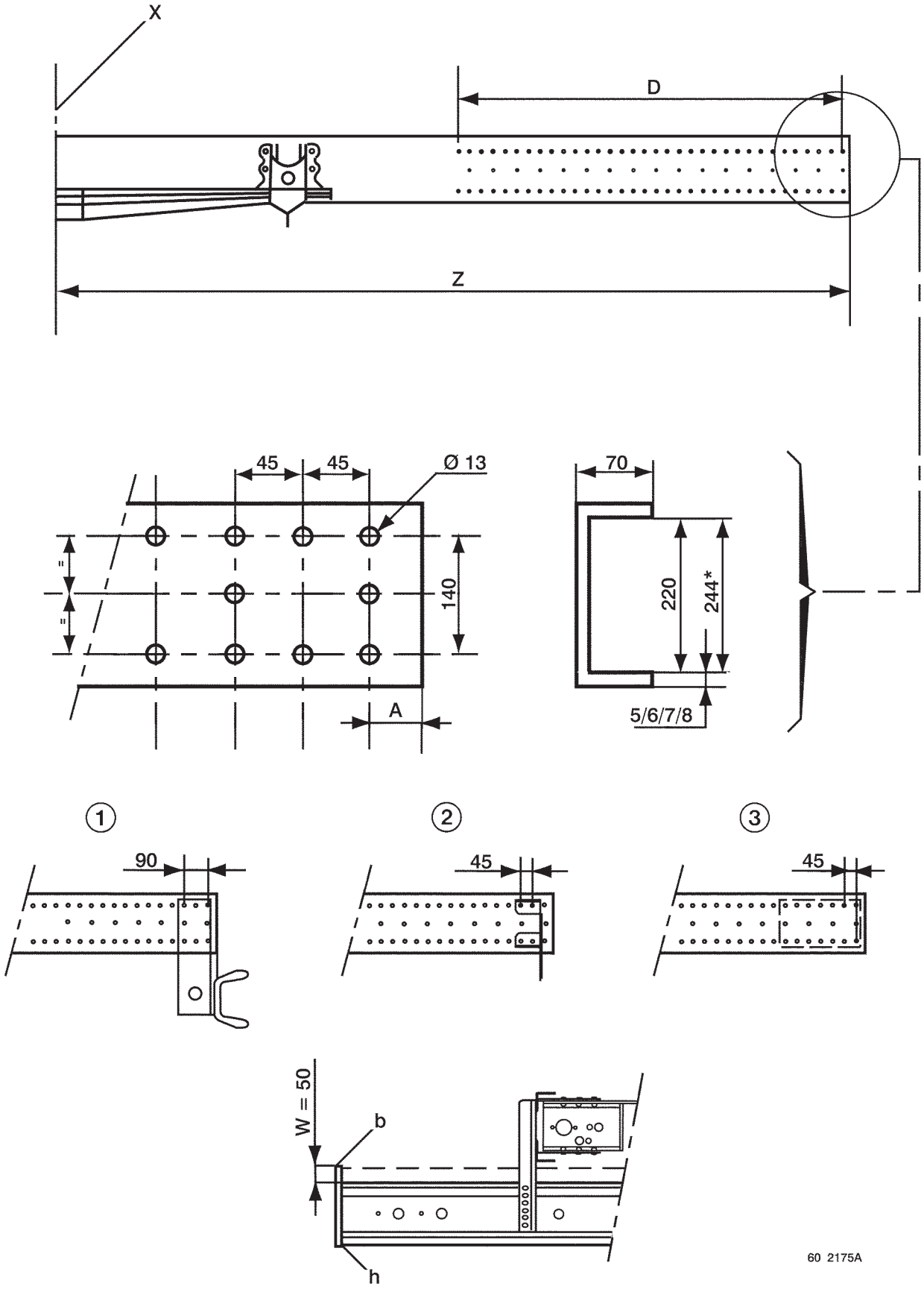


Table of possible horizontal positionings

Vehicle	E	A	D	Z
MIDLUM C/C' 2-door cab	3070	37	585	1700
	3350	37	765	1882
	3650	37	990	2107
	3950	37	1170	2287
	4550	37	1440	2692
	5150	37	1485	3097
	5750	37	1710	3457
	6480	37	1485	3817
MIDLUM D 2-door cab	3650	32	270	1362
	3950	32	360	1452
	4250	32	540	1632
	4550	32	675	1767
	4850	32	800	1902
	5150	32	990	2082
	5450	32	1125	2217
	5750	32	990	2397
	6050	32	990	2522
	6480	32	1305	2757
	6780	32	1305	2907
MIDLUM HD/Construction 2-door cab	3070	37	585	1700
	3350	37	765	1882
	3650	37	990	2107
	3950	37	1170	2287
	4550	37	1440	2692
MIDLUM C' 4-door cab	3350	37	270	1367
	3650	37	405	1507
	3950	37	675	1807
	4550	37	1170	2437
	5150	37	1485	3097
MIDLUM C 4-door cab	3350	37	360	1467
	3650	37	540	1652
	3950	37	855	1967
	4550	37	1350	2597
	5150	37	1530	3122
MIDLUM HD/Construction 4-door cab	3350	37	360	1467
	3650	37	540	1652
	3950	37	855	1967
	4550	37	1350	2597

Key to diagrams on following pages:
a - High position
b - Low position
W - Maximum vertical displacement
X - Rear axle centre-line
Z - Maximum overhang
1 - Run-under guard
2 - Lighting bar lamps
3 - Towing crossmember

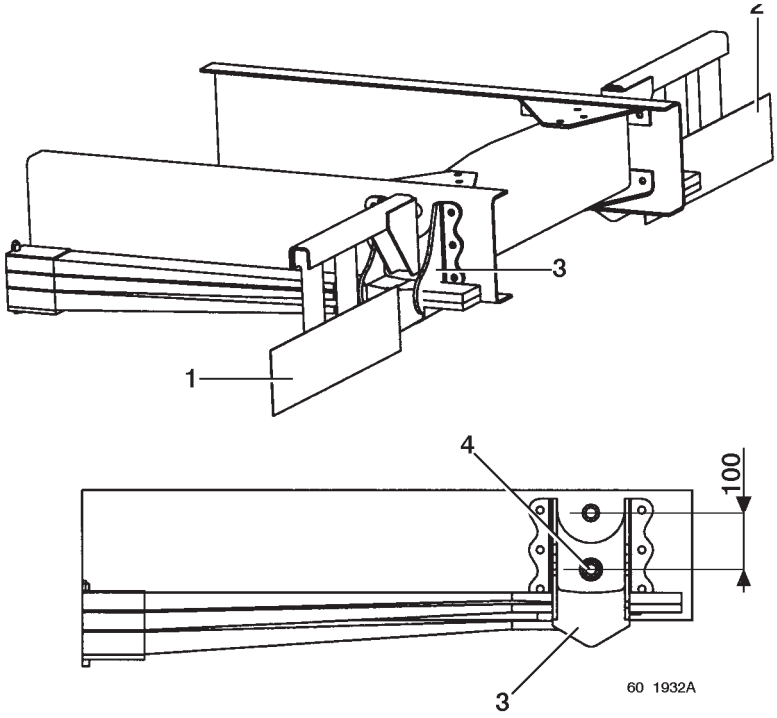
MIDLUM C'/C/D*/HD/Construction



5.5 Assembly of rear lamps to lighting bar - tractor version (on MIDLUM C/C'/HD/Construction only)

In the event of reduction of the rear overhang, the rear lamps can be assembled on a rear lighting bar in accordance with fittings to MIDLUM tractors. It is then necessary to replace the lamp brackets.
Drill a 13 mm diameter hole at point (**4**).
Fit the nuts and bolts and tighten to torque.

Procurement:
- LH bracket ref. N° 50 00 452 773
- RH bracket ref. N° 50 00 452 775
- 4 collar screws M12x125x80 class 10.9 ref. N° 50 03 002 067
- 4 flanged nuts DRH M12 class 10.9 ref. N° 50 03 033 012



1 - LH lamp bracket
2 - RH lamp bracket
3 - spring rear hanger
4 - hole dia. 13 mm to be drilled

5.6 Changing the position of the cab tilting manual pump

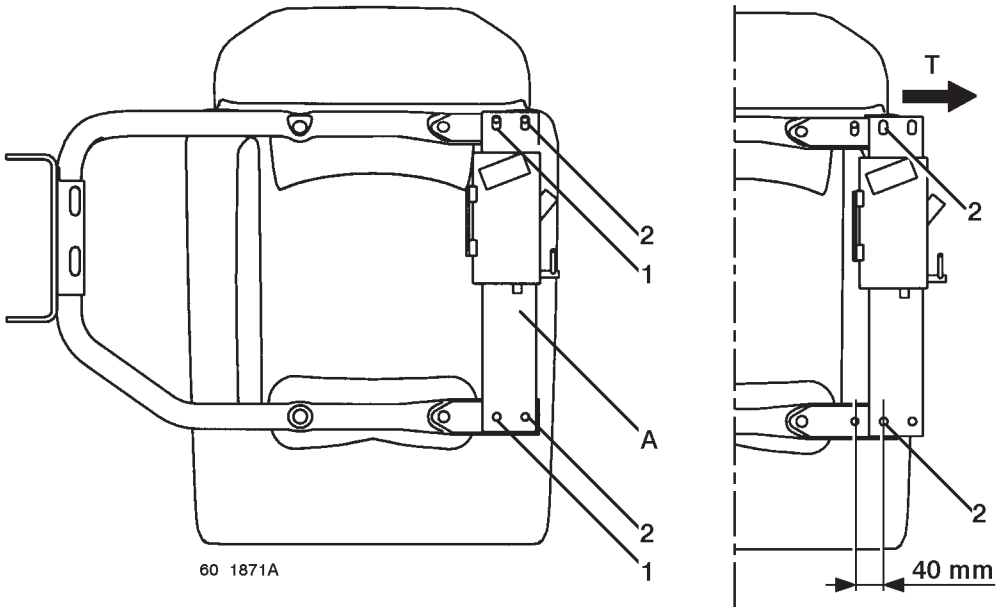
When fitting a body with overall width greater than or equal to 2550 mm, check that the cab tilting pump lever runs its full travel and that it does not abut with the lower RH corner of the bodywork.

If necessary, change the position of the cab tilting manual pump.
Depending on the vehicle, there are two possible positions for the change.

Any other method of changing position is authorized only if:
- it does not involve work on the tilting hydraulic system,
- it does not generate any mechanical, thermal or wear stress to high-pressure piping.

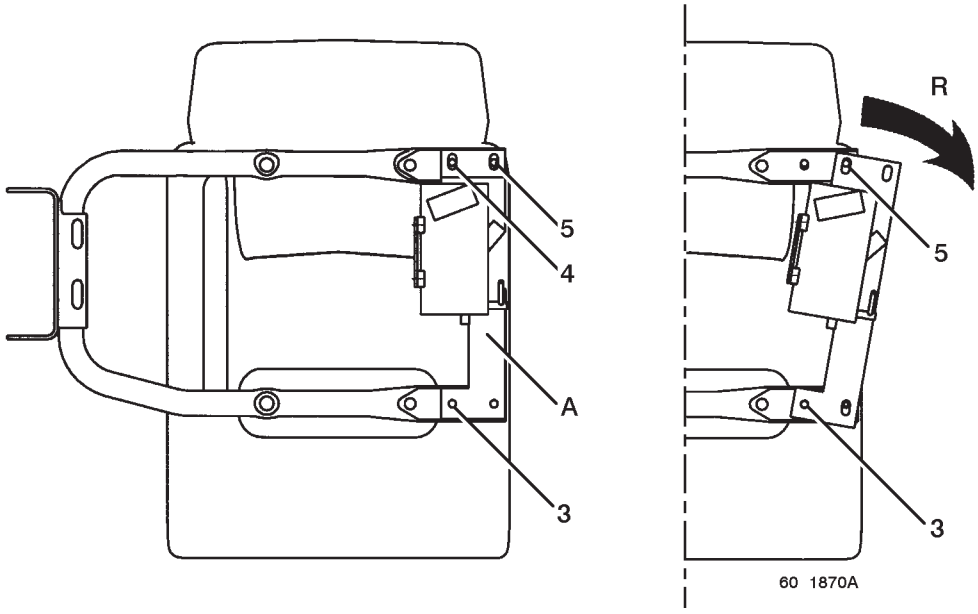
MIDLUM C/C'/HD/Construction

The position of the pump is changed by pushing the bracket in direction (**T**) towards the exterior.
The internal oblong holes in bracket (**A**) are to be moved from (**1**) to (**2**).



MIDLUM B

The position of the pump is changed by rotating the bracket in direction (**R**) in relation to the stud (**3**).
The internal oblong hole in bracket (**A**) is to be moved from (**4**) to (**5**).

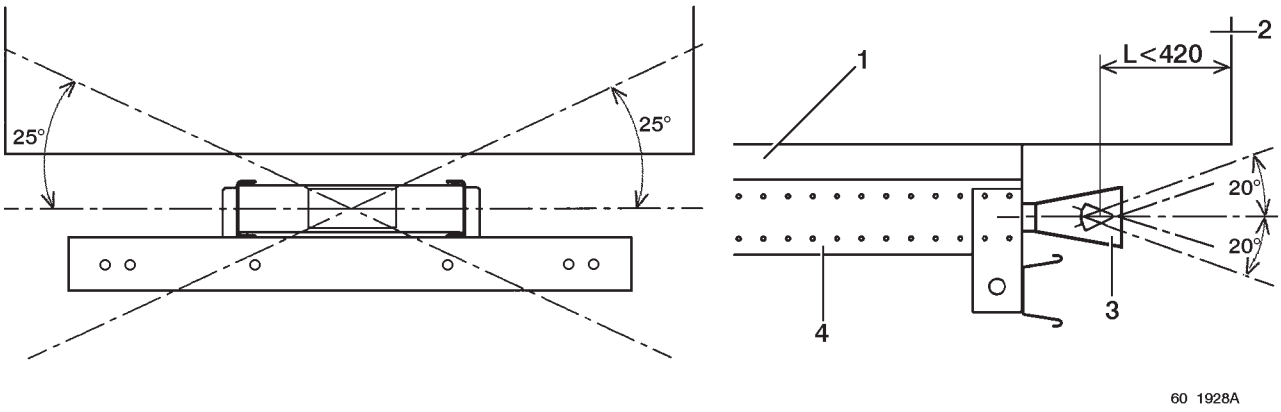


5.7 Trailer hitch coupling

5.7.1 Maximum permissible range of movement

The maximum permissible range of movement is given for guidance for a sub-frame with height 100 mm, a towbar diameter of 65 mm and a body protrusion distance (L) less than 420 mm.

1 - Sub-frame
2 - Body
3 - Towing hook
4 - Chassis



5.7.2 Towing crossmember

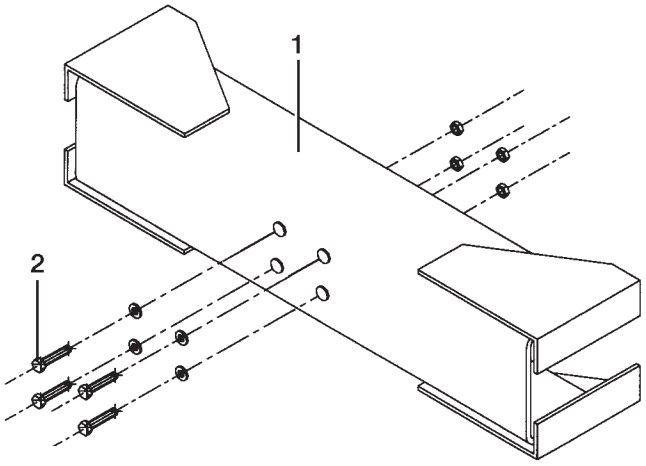
Table of towing crossmembers in relation to towed load

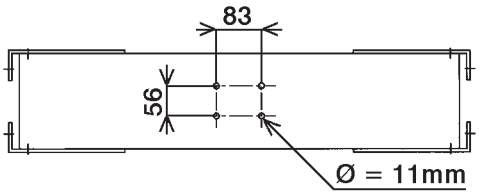
Vehicle	Maximum towable load (C)	
	C ≤ 3500 kg	**C > 3500 kg**
MIDLUM B	50 10 238 113	50 10 228 647
MIDLUM C'/C	50 10 228 650	50 10 228 649
MIDLUM D		
MIDLUM HD/ construction		

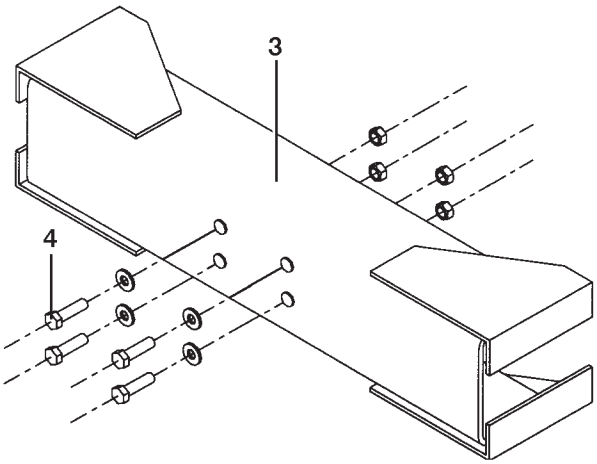
The towing crossmember is to be attached to the chassis by means of bolt hardware 12x125 with locknuts, class 10.9 with S2S protection. The use of nuts with nylon ring (e.g. Nyloc) are forbidden. Tighten to torque. The towing hook is to be attached to the crossmember by means of nut and bolt hardware, class 10.9 with S2S protection. The use of nuts with nylon ring (e.g. Nyloc) are forbidden. Tighten to torque.

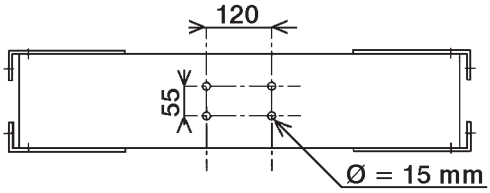
Key to diagram

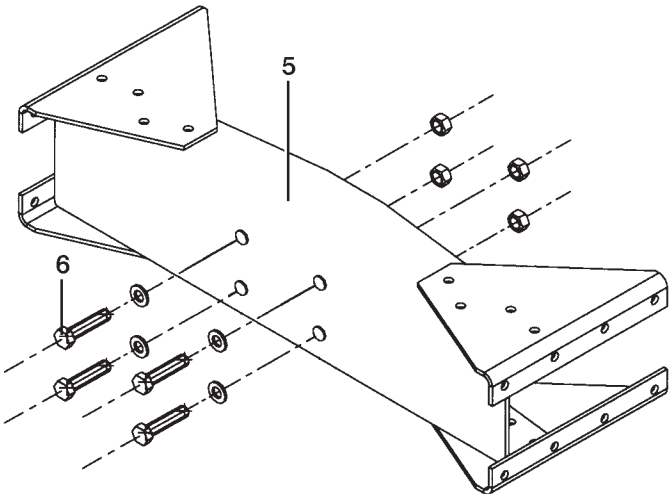
1 - Crossmember 50.10.328.113 & 50.10.228.650
2 - Bolt HM10x125x50, washer 10x20x2.5, nut DRH M10
3 - Crossmember 50.10.228.647
4 - Bolt HM14x150x80, washer 14x30x3.2, nut DRH M14
5 - Crossmember 50.10.228.649
6 - Bolt HM16x150x70, washer 16x30x3, nut DRH M16

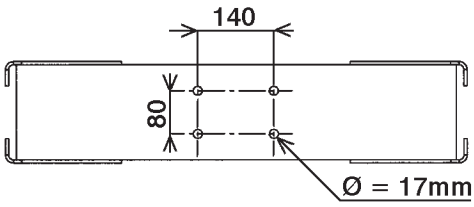












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6. CAB FOOTPRINT

When fitting equipment behind and above the cab (e.g. reefer unit), consideration must be taken of cab overall dimensions due to:
- cab vertical and horizontal range of movement (suspended cab),
- cab tilting.

The clearance zone for cab tilting takes into consideration:
- range of movement of cab suspension,
- safety clearance to be kept between cab and equipment.

No built-on element is be located in this zone.

The minimum clearance (**J**) should be no less than the minimum clearance recommended in the tables so as to avoid contact between the bodywork and the rear end of the cab.

The values (**H - J - K**) are to be observed for vehicles fitted with under-floor engine air intakes and lateral exhausts.

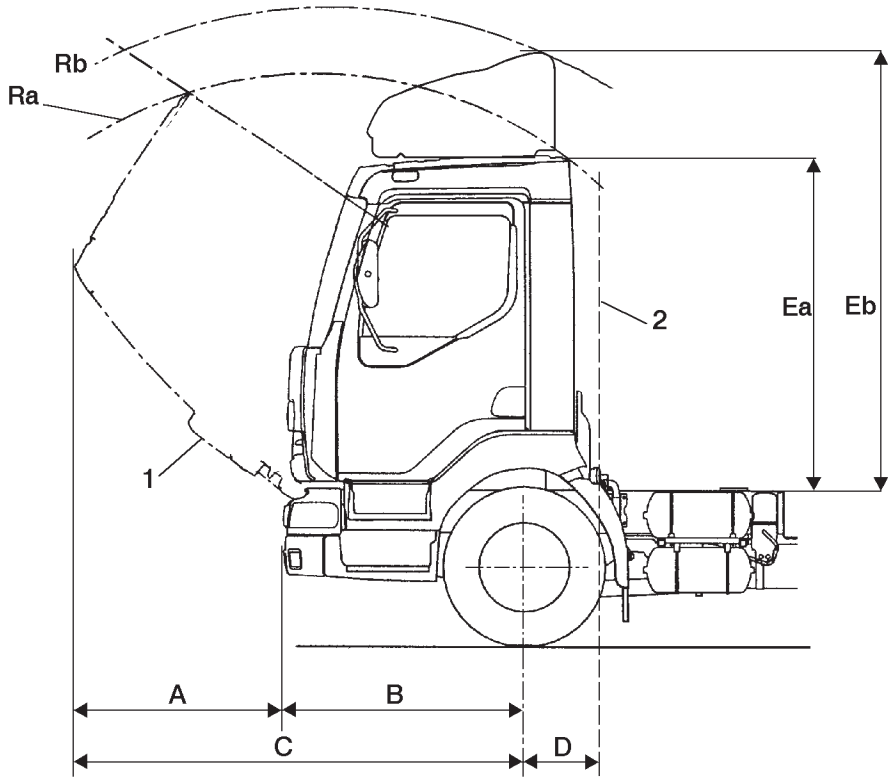
6.1 Day cab

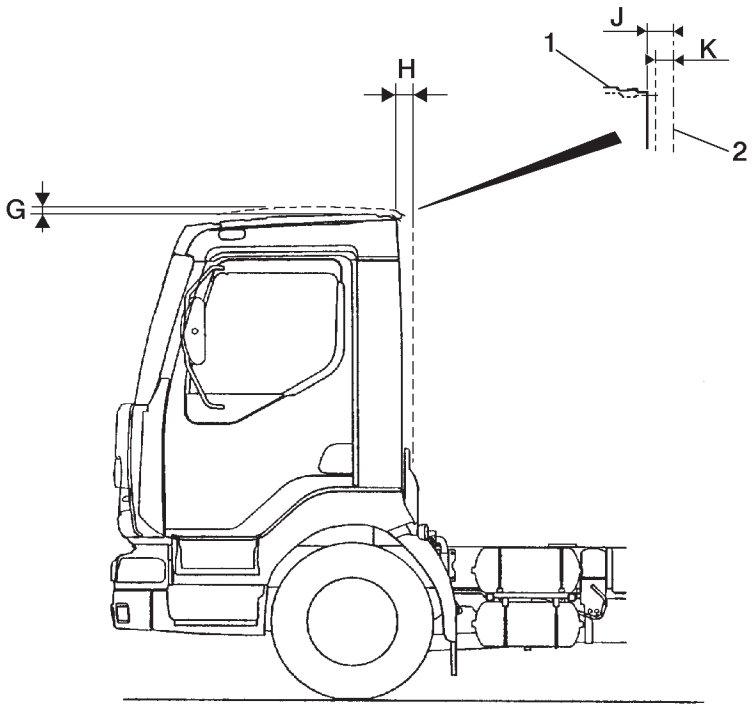
Vehicle	**MIDLUM B**	**MIDLUM C' / C**		**MIDLUM HD construction/4x4**		**MIDLUM D**	
Cab suspension	**Rubber mountings**	**Rubber mountings**	**Mixed**	**Rubber mountings**	**Mixed**	**Mixed**	**Springs**
A	1138			1073		1138	
B	1275	1325		1390		1325	
C	2413	2463					
Ea	1877						
Eb	2479						
G	25		35	25	35		
H	30		50	30	50		
J	100						128
K	95	70	50	70	50		70
Ra	2320						2342
Rb	2774						2796

Key
1 - Cab
2 - Bodywork maximum advance
A - Front protrusion of tilted cab in relation to shield
B - Front overhang
C - Front protrusion of tilted cab in relation to front axle centre-line
Ea - Height of cab in relation to sidemember (without RENAULT V.I. roof-mounted deflector)
Eb - Height of cab in relation to sidemember (with RENAULT V.I. roof-mounted deflector)
G - Cab maximum vertical movement
H - Cab maximum horizontal movement
J - Minimum clearance between cab and body at standstill
K - Minimum clearance between cab and body upon start-up
Ra - Radius of clearance necessary for tilting the cab (without RENAULT V.I. roof-mounted deflector)
Rb - Radius of clearance necessary for tilting the cab (with RENAULT V.I. roof-mounted deflector)

- Mixed cab suspension: cab suspended on 2 flexible mountings to the front and 2 spring/shock absorber combinations to the rear.
- Cab suspension with flexible mountings: cab suspended on 4 flexible mountings.

- Integral spring suspension: cab suspended by 4 spring/shock absorber combinations.





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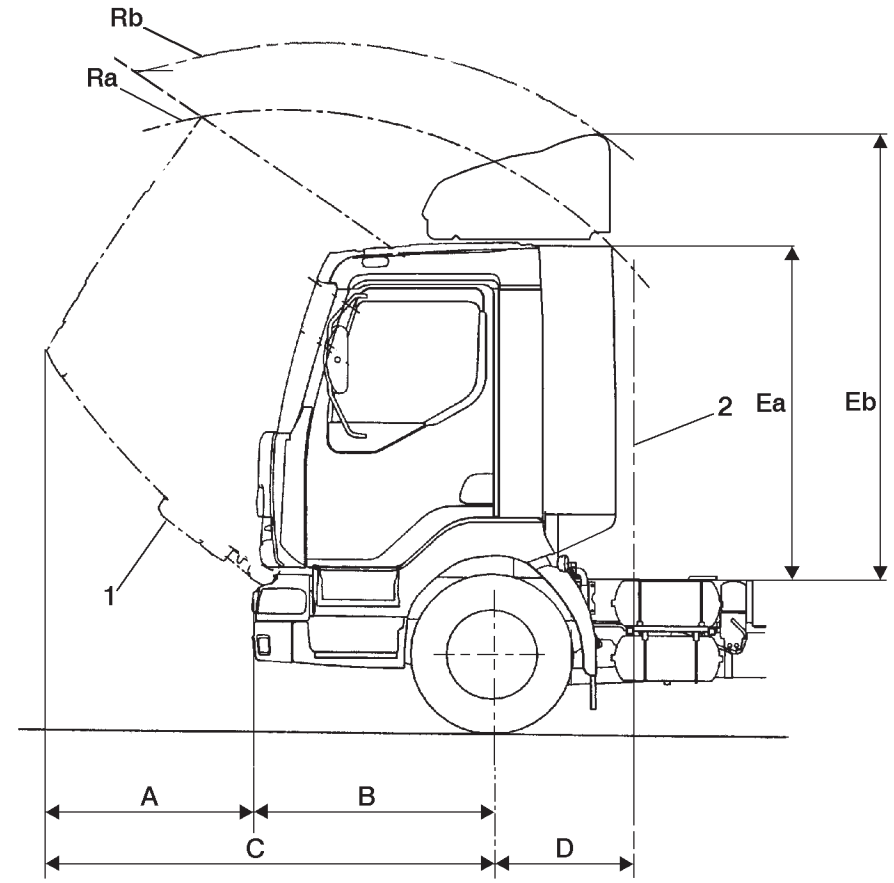
6.2 Sleeper cab

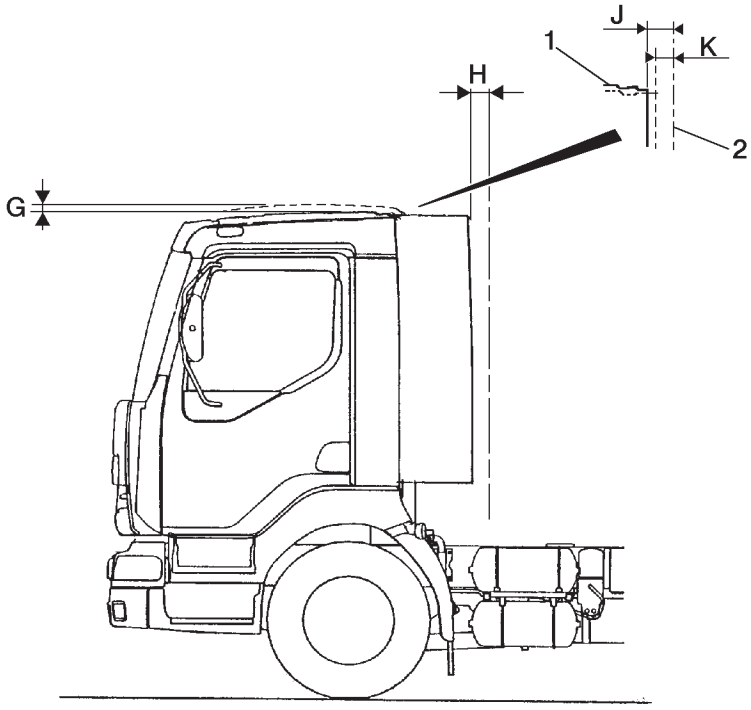
Vehicle	MIDLUM B	MIDLUM C' / C		MIDLUM HD construction		MIDLUM D	
Cab suspension	**Rubber mountings**	**Rubber mountings**	**Mixed**	**Rubber mountings**	**Mixed**	**Mixed**	**Springs**
A	1138			1073		1138	
B	1275	1325		1390		1325	
C	2413	2463					
Ea	1877						
Eb	2487						
G	25		28	25	28		30
H	30						35
J	45						
K	15						10
Ra	2585						2608
Rb	2944						2967

Key
1 - Cab
2 - Bodywork maximum advance
A - Front protrusion of tilted cab in relation to shield
B - Front overhang
C - Front protrusion of tilted cab in relation to front axle centre-line
Ea - Height of cab in relation to sidemember (without RENAULT V.I. roof-mounted deflector)
Eb - Height of cab in relation to sidemember (with RENAULT V.I. roof-mounted deflector)
G - Cab maximum vertical movement
H - Cab maximum horizontal movement
J - Minimum clearance between cab and body at standstill
K - Minimum clearance between cab and body upon start-up
Ra - Radius of clearance necessary for tilting the cab (without RENAULT V.I. roof-mounted deflector)
Rb - Radius of clearance necessary for tilting the cab (with RENAULT V.I. roof-mounted deflector)

- Mixed cab suspension: cab suspended on 2 flexible mountings to the front and 2 spring/shock absorber combinations to the rear.
- Cab suspension with flexible mountings: cab suspended on 4 flexible mountings.

- Integral spring suspension: cab suspended by 4 spring/shock absorber combinations.





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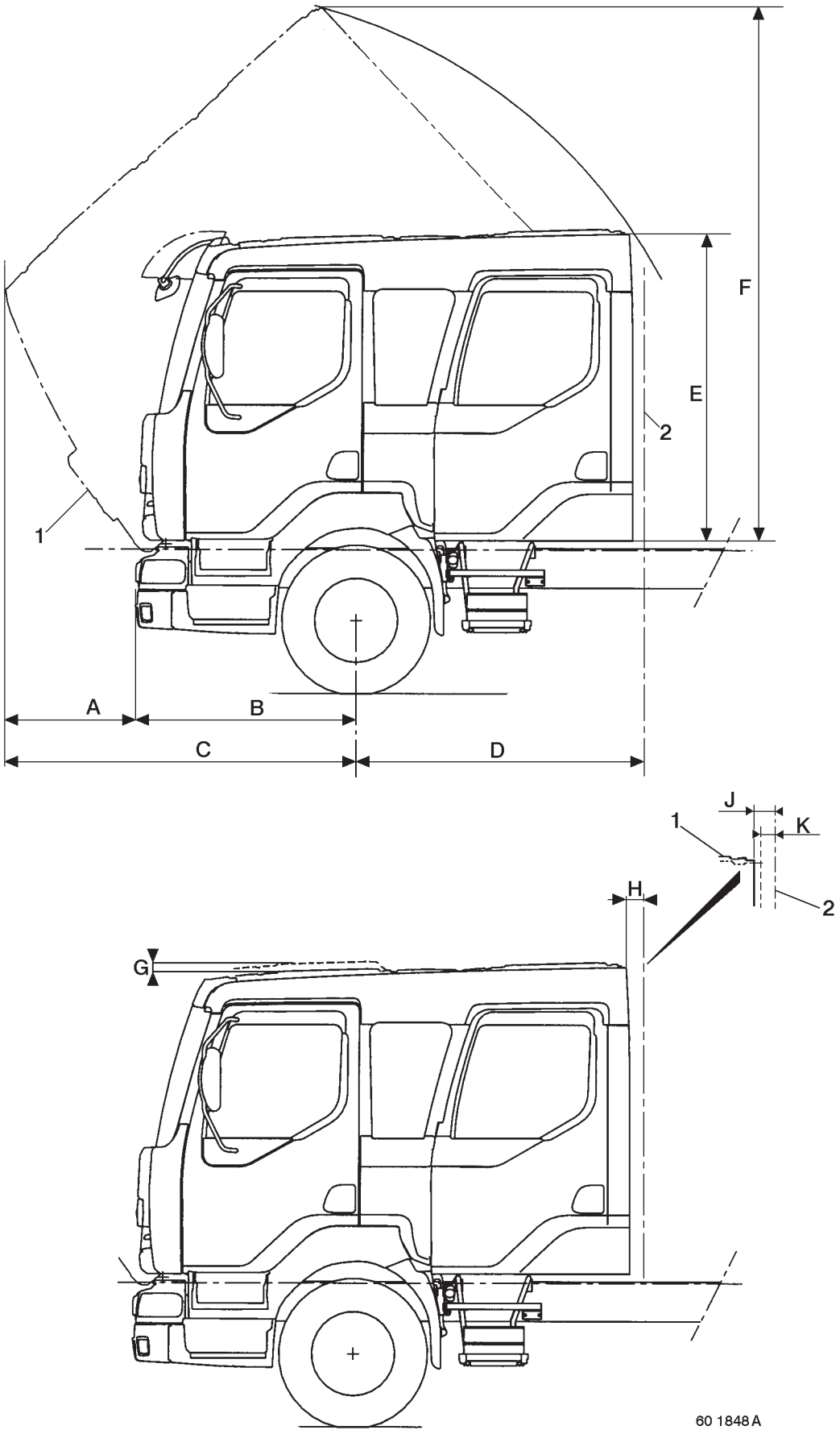
6.3 6/7 place cab

	MIDLUM B	MIDLUM C / C'	MIDLUM HD construction / 4x4
A	777		712
B	1275	1325	1390
C	2052	2102	
E	1882		
F	3230		
G	28		
H	30		
J	50		
K	20		
R	3344		

Key
1 - cab
2 - bodywork maximum advance
A - front protrusion of tilted cab in relation to shield
B - front overhang
C - front protrusion of tilted cab in relation to front axle centre-line
E - height of cab (in relation to sidemember)
F - maximum height of tilted cab (in relation to sidemember)
G - cab maximum vertical movement
H - cab maximum horizontal movement
J - minimum clearance between cab and body at standstill
K - minimum clearance between cab and body upon start-up
R - radius of clearance zone necessary for tilting the cab


F
E
2
1
A
B
C
D
J
K
1
H
2
G
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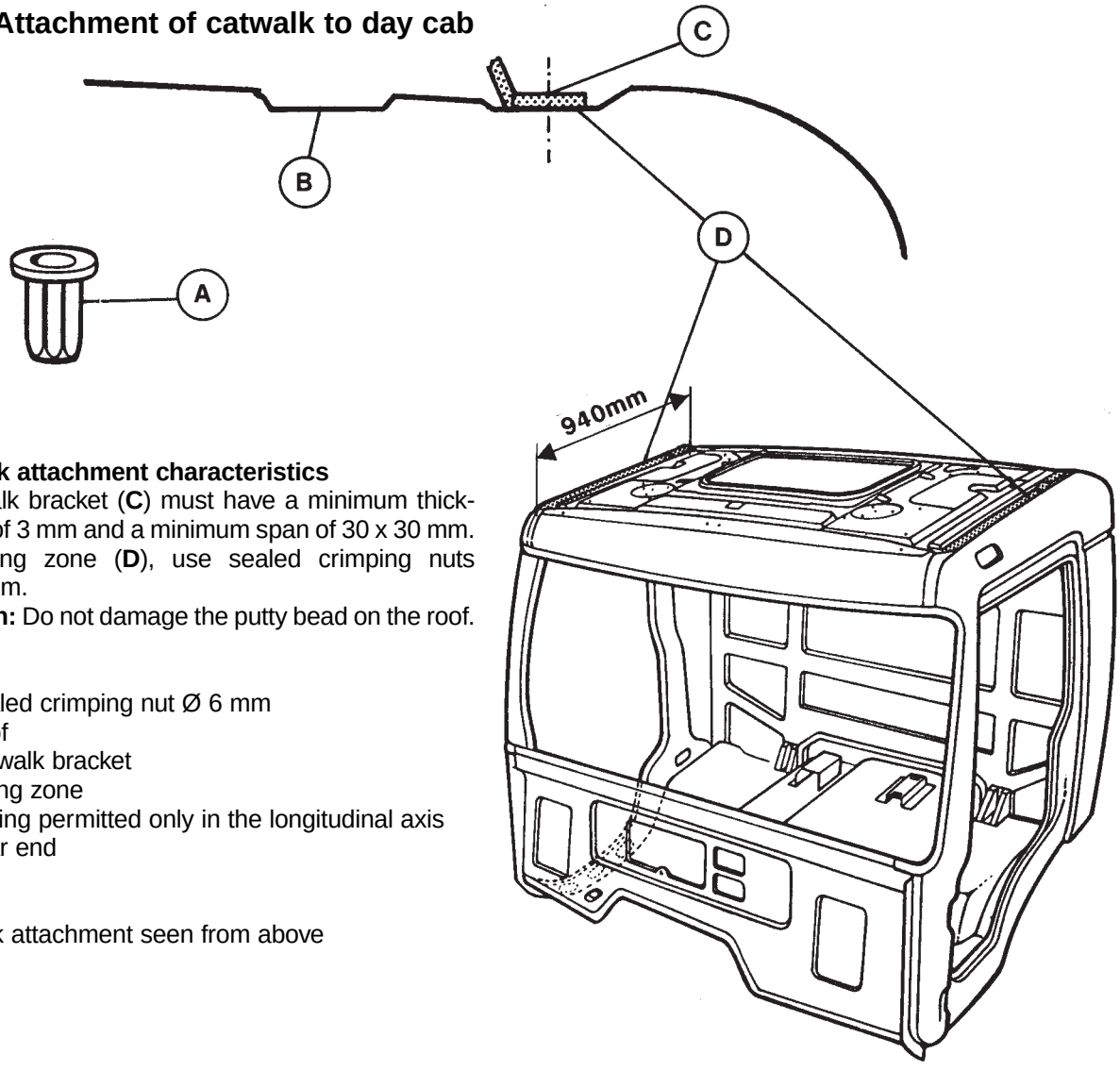
7. ASSEMBLY OF EQUIPMENT TO CAB

7.1 Roof catwalk

The cab roofs are designed to accommodate the attachment of a catwalk.

7.1.1 Attachment of catwalk to day cab



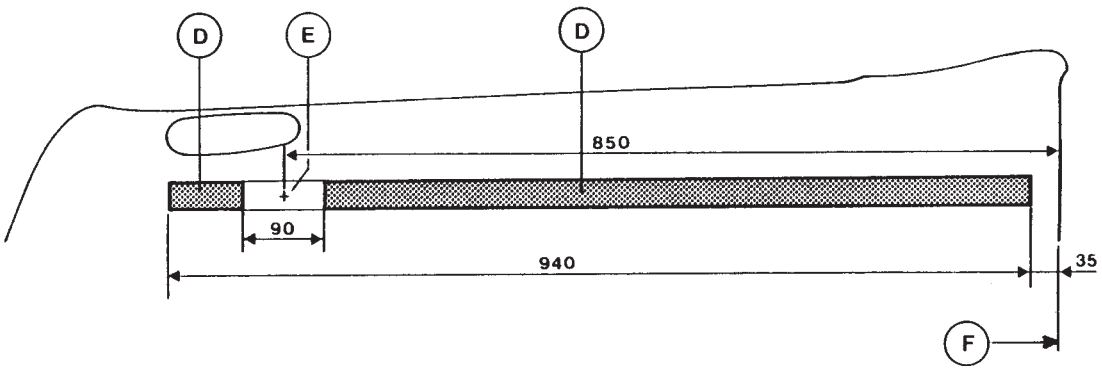
Catwalk attachment characteristics

- Catwalk bracket (**C**) must have a minimum thickness of 3 mm and a minimum span of 30 x 30 mm.
- In fixing zone (**D**), use sealed crimping nuts Ø 6 mm.

Caution: Do not damage the putty bead on the roof.

A - Sealed crimping nut Ø 6 mm
B - Roof
C - Catwalk bracket
D - Fixing zone
E - Drilling permitted only in the longitudinal axis
F - Rear end

Catwalk attachment seen from above



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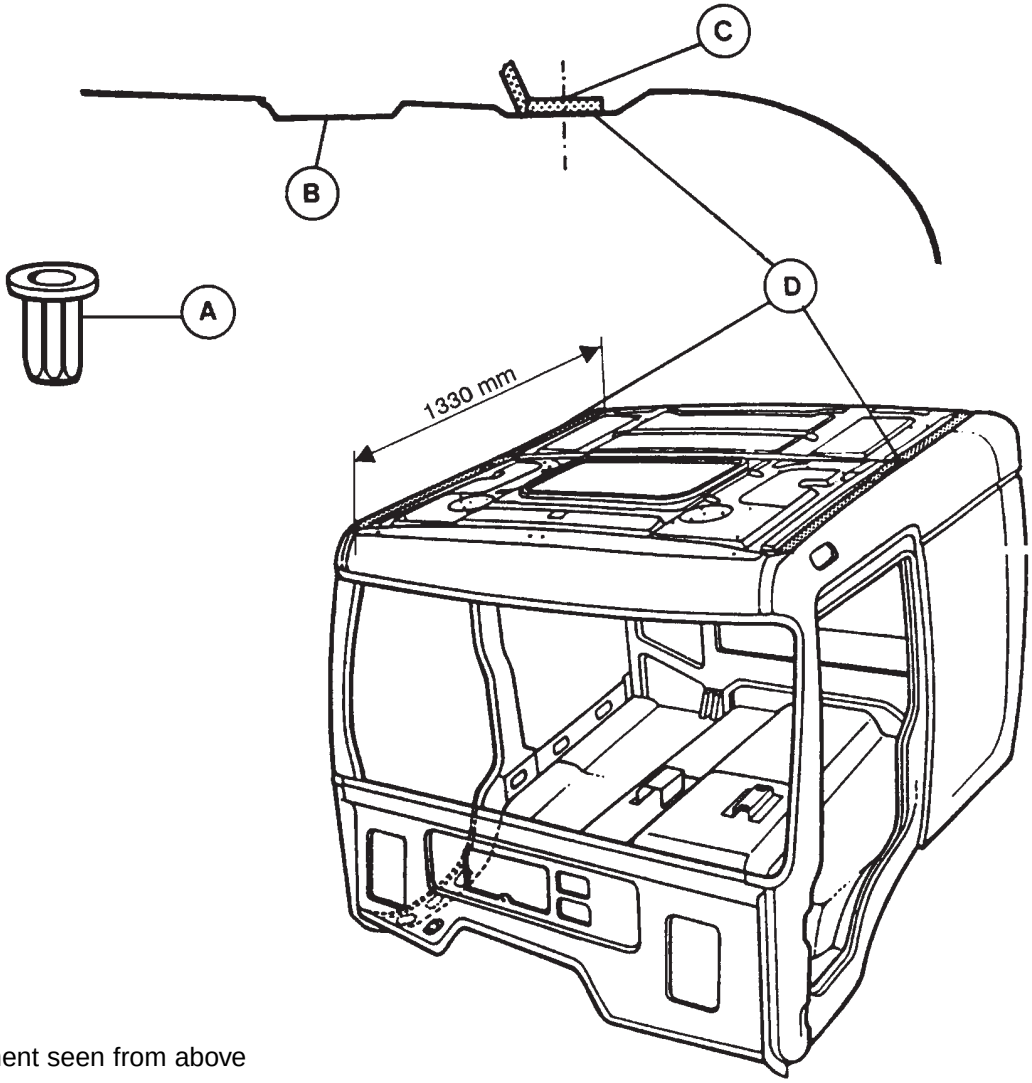
7.1.2 Attachment of catwalk to sleeper cab

Catwalk attachment characteristics

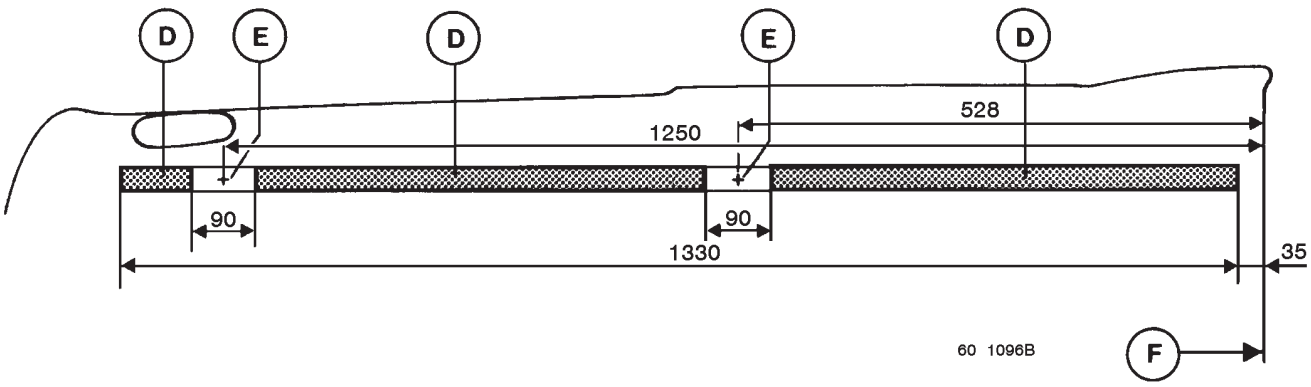
- Catwalk bracket (**C**) must have a minimum thickness of 3 mm and a minimum span of 30 x 30 mm.
- In fixing zone (**D**), use sealed crimping nuts Ø 6 mm.

Caution: Do not damage the putty bead on the roof.

A - Sealed crimping nut Ø 6 mm
B - Roof
C - Catwalk bracket
D - Fixing zone
E - Drilling permitted only in the longitudinal axis
F - Rear end



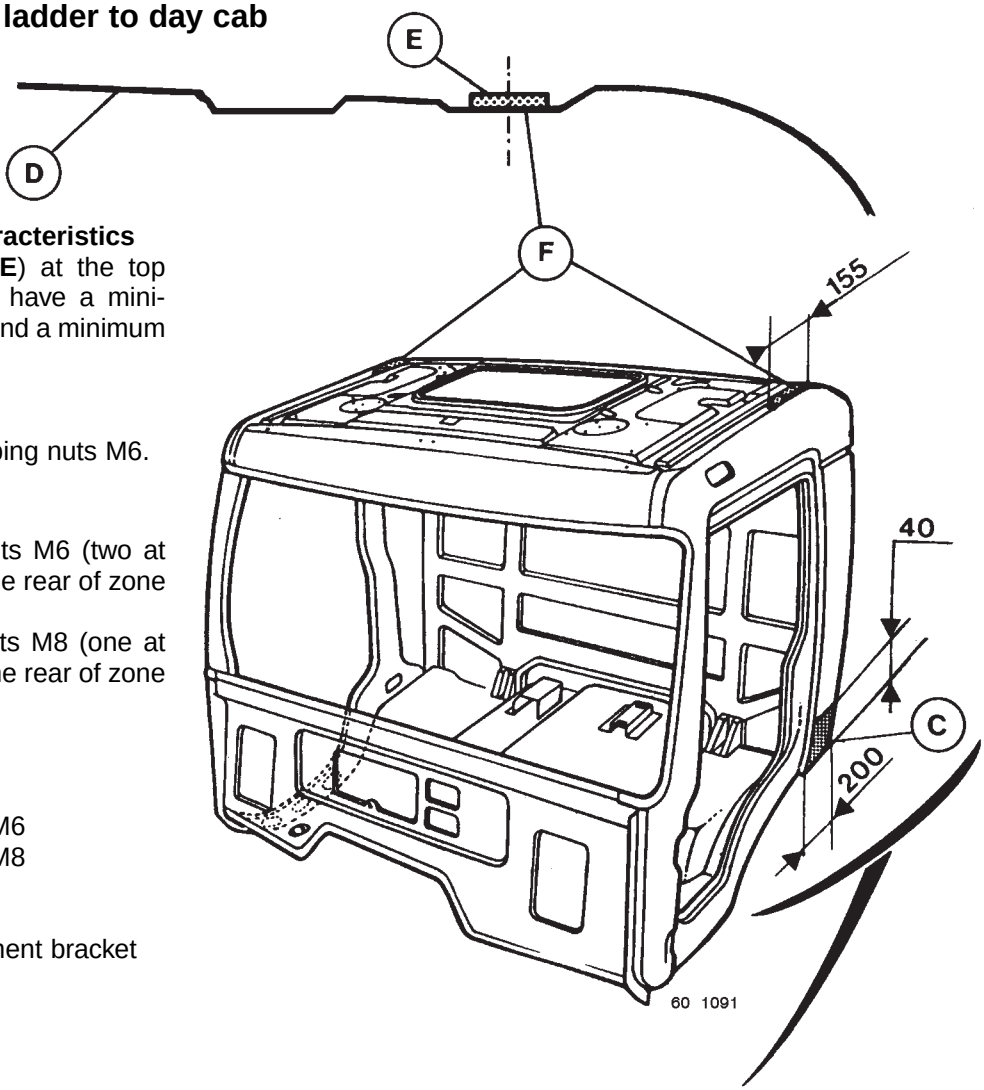
Catwalk attachment seen from above



7.2 Ladder

The design of the roof and the lower parts of the cab sides allow a ladder to be attached on the LH side or on the RH side, except for the RH side of day cabs.

7.2.1 Attachment of ladder to day cab



Ladder attachment characteristics

The ladder brackets (**C-E**) at the top and at the bottom must have a minimum thickness of 3 mm and a minimum span of 30 x 30 mm.

Top part (zone F):

- one or two sealed crimping nuts M6.

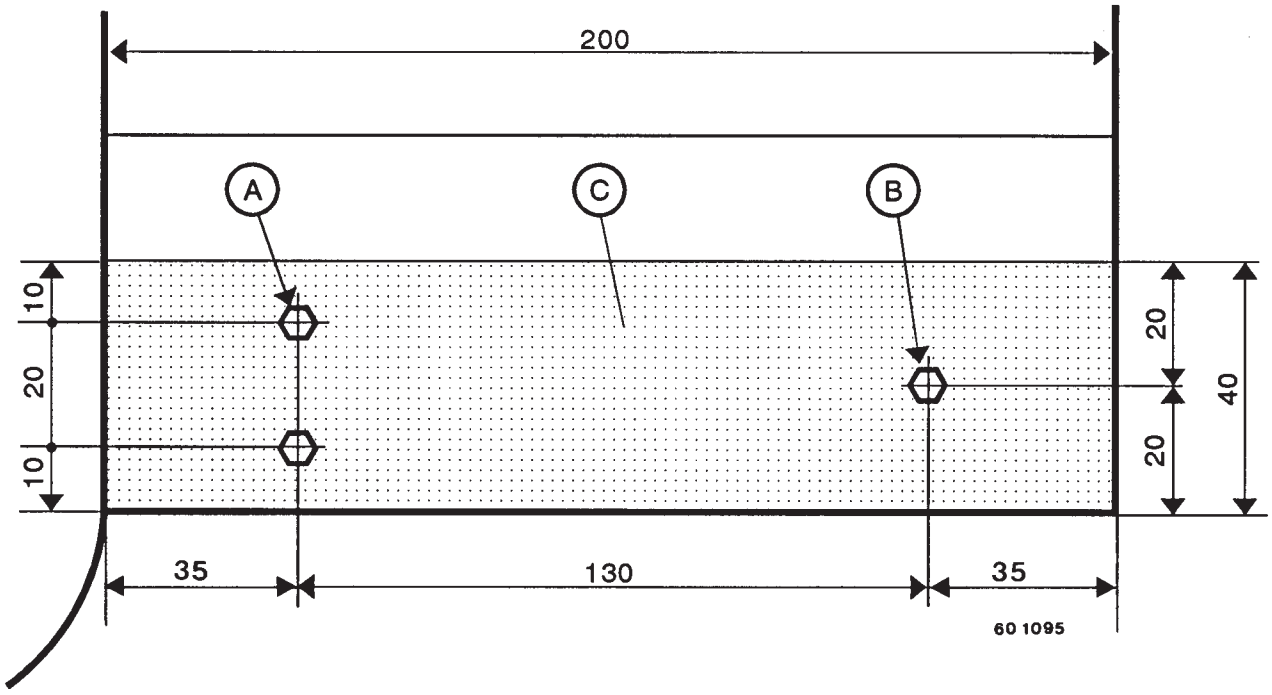
Bottom part (zone C):

Two possibilities:

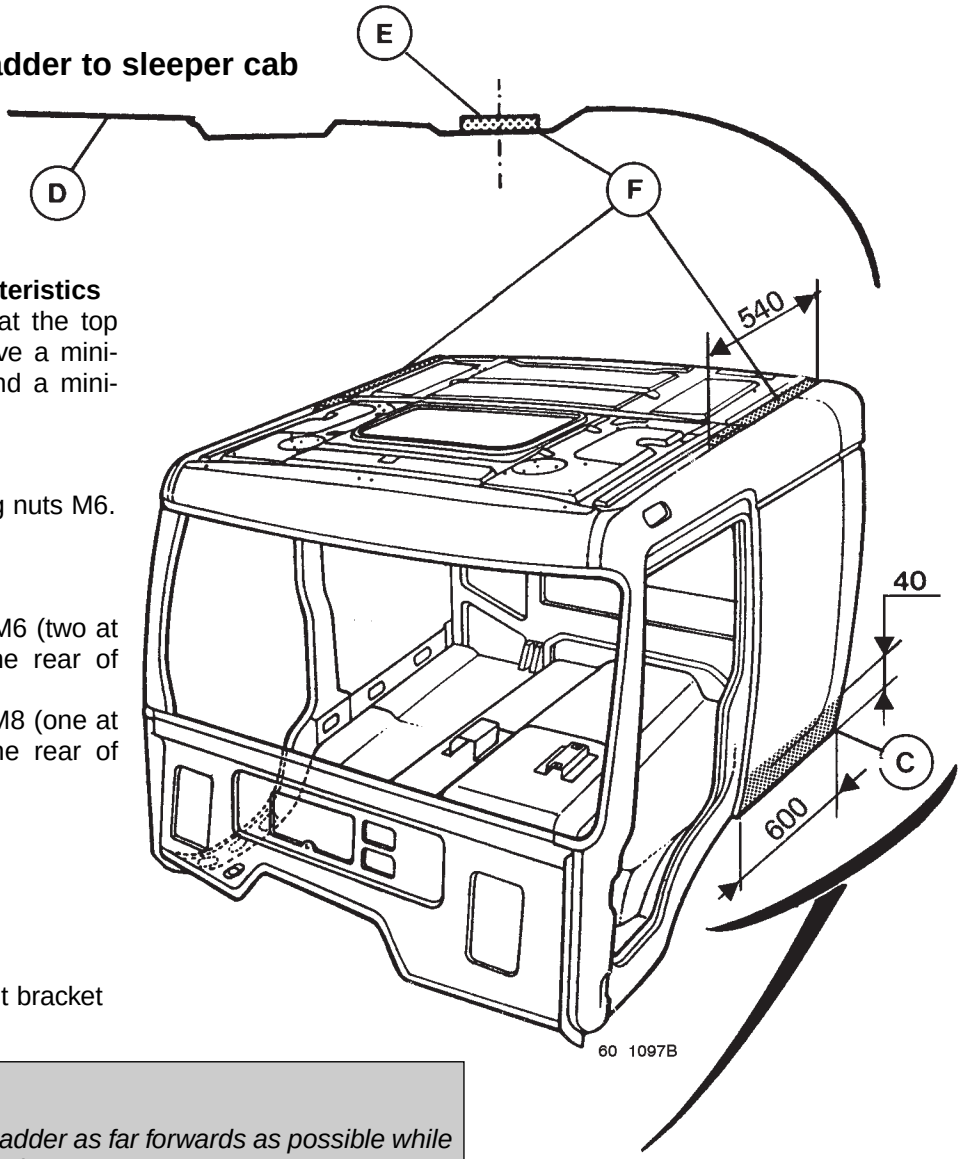
A - 4 sealed crimping nuts M6 (two at the front and two at the rear of zone (**C**).

B - 2 sealed crimping nuts M8 (one at the front and one at the rear of zone (**C**).

A - Sealed crimping nut M6
A - Sealed crimping nut M8
C - Lower fixing zone
D - Roof
E - Ladder upper attachment bracket
F - Upper fixing zone



7.2.2 Attachment of ladder to sleeper cab



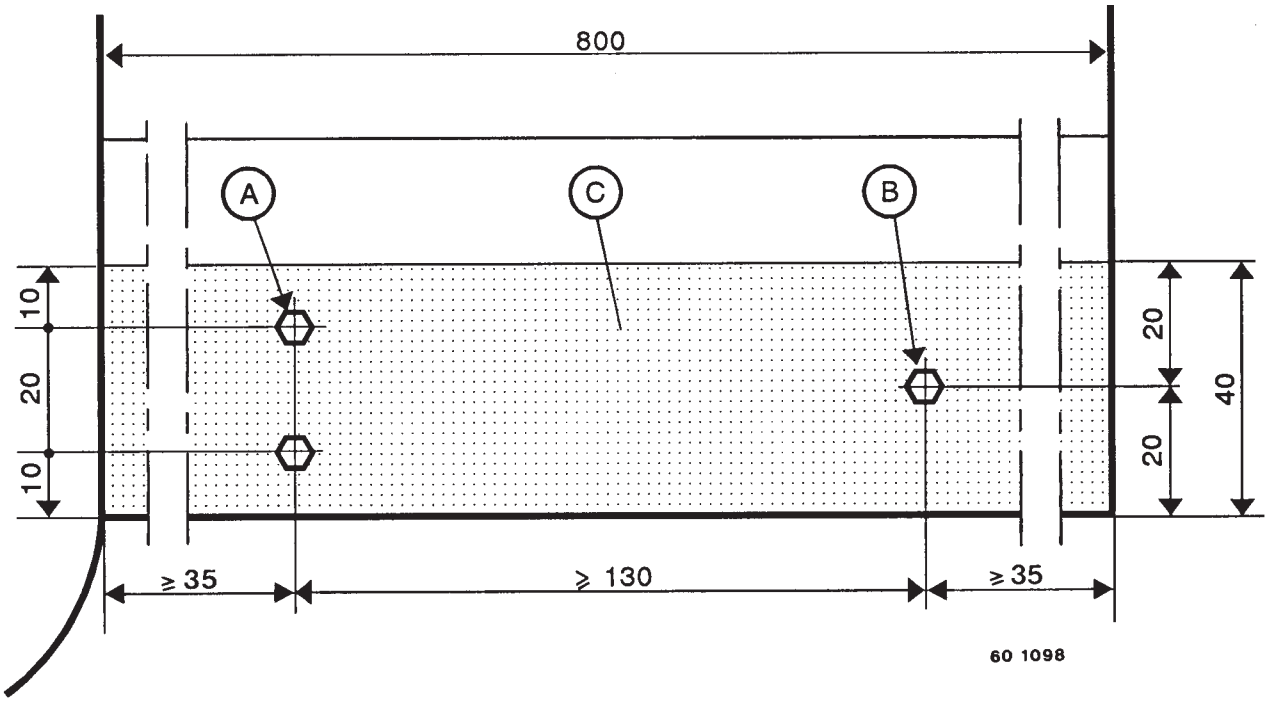
Ladder attachment characteristics
The ladder brackets (**C-E**) at the top and at the bottom must have a minimum thickness of 3 mm and a minimum span of 30 x 30 mm.

Top part (zone F):
- one or two sealed crimping nuts M6.

Bottom part (zone C):
Two possibilities:
A - 4 sealed crimping nuts M6 (two at the front and two at the rear of zone (**C**).
B - 2 sealed crimping nuts M8 (one at the front and one at the rear of zone (**C**).

A - Sealed crimping nut M6
A - Sealed crimping nut M8
C - Lower fixing zone
D - Roof
E - Ladder upper attachment bracket
F - Upper fixing zone

IMPORTANT
It is advised to position the ladder as far forwards as possible while observing the dimensions below, so as to:
- facilitate access to the ladder,
- avoid any interference between the ladder and external lugs on chassis or cab.



7.3 Assembly of accessories on roof

IMPORTANT
The roof is different according to the cab original fitment equipment:
- Welded fixing nuts (1) for the deflector are used only with roof stiffeners on cabs equipped with deflector as standard.
- Sunshade, frontview mirror and gantry are components requiring the presence of a stiffener (2) welded as standard to the cab for their installation. This stiffener, located in an inaccessible zone, cannot be assembled as aftermarket fitment. On account of this, installation of sunshade, gantry and frontview mirror can only be carried out if certain conditions are met. Installation possibilities are detailed in chapter C-7.3.5, 7.3.6, 7.3.7.

1 - Weld nuts
2 - Canopy reinforcement
3 - Canopy
4 - Roof
5 - Roof extension (sleeper cab)
6 - Stiffener extension (sleeper cab)
7 - Stiffener

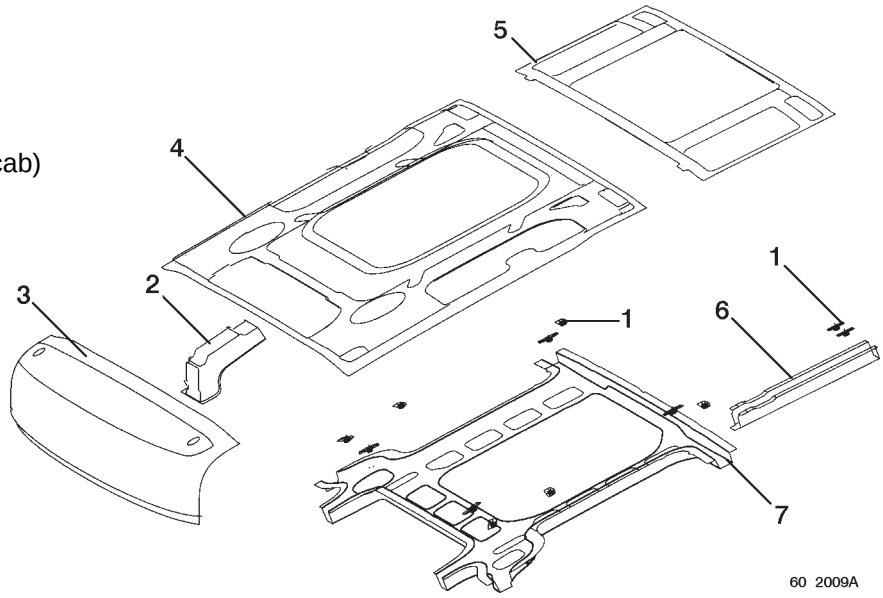


Table of roof assembly possibilities

The following table indicates:
- the exhaustive list of possible assemblies and combinations,
- the minimum configuration necessary for assembly.

Any combination other than that quoted in the table is forbidden (especially deflector / gantry incompatibility).

Assembly possibility according to roof	Roof configuration	
	Nuts (1)	Stiffener (2)
Gantry	X	X
Gantry and sunshade	X	X
Gantry and frontview mirror	X	X
Gantry, sunshade and frontview mirror	X	X
Deflector and sunshade	X	X
Deflector and frontview mirror	X	X
Deflector, sunshade and frontview mirror	X	X
Sunshade		X
Frontview mirror		X
Sunshade and frontview mirror		X
Deflector	X (*)	

(*) Weld nuts are used in the case of replacement of a deflector by a gantry.
If not, it is essential to use the clamping segments supplied with the deflector assembly kit.

Equipment capable of being assembled, whatever the roof:
- Revolving beacons
- CB antenna
- Telephone antenna
- Air horns.

On the roof, impressions locate the position of accessory fastenings

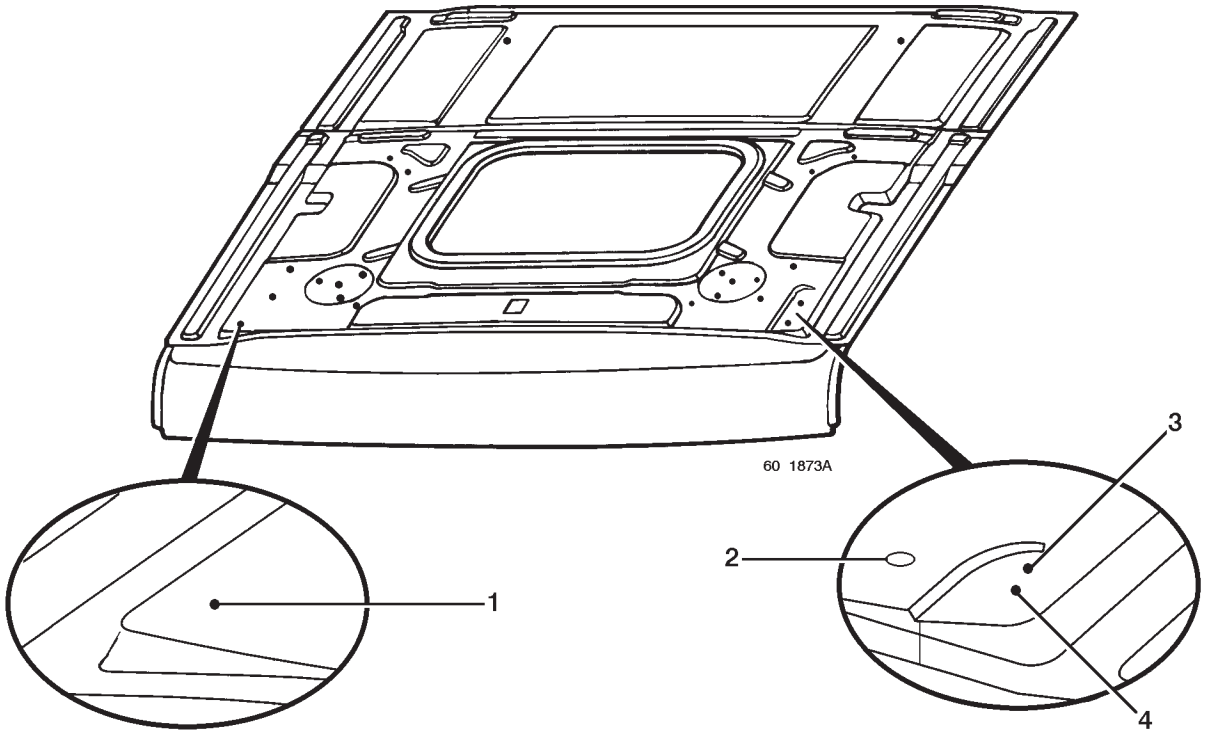
7.3.1 Installation of antennae

CB antenna:
- Wiring harness passage: at point (**3**), drill a hole diameter 4.5 mm.
- Antenna fastening: at point (**4**), drill a hole diameter 8.5 mm.

Telephone antenna
- At point (**1**), drill a hole diameter 14.5 mm.

Fire antenna
- Locate drilling point (**2**) using the template supplied in the installation kit
- Drill a hole diameter 24.5 mm

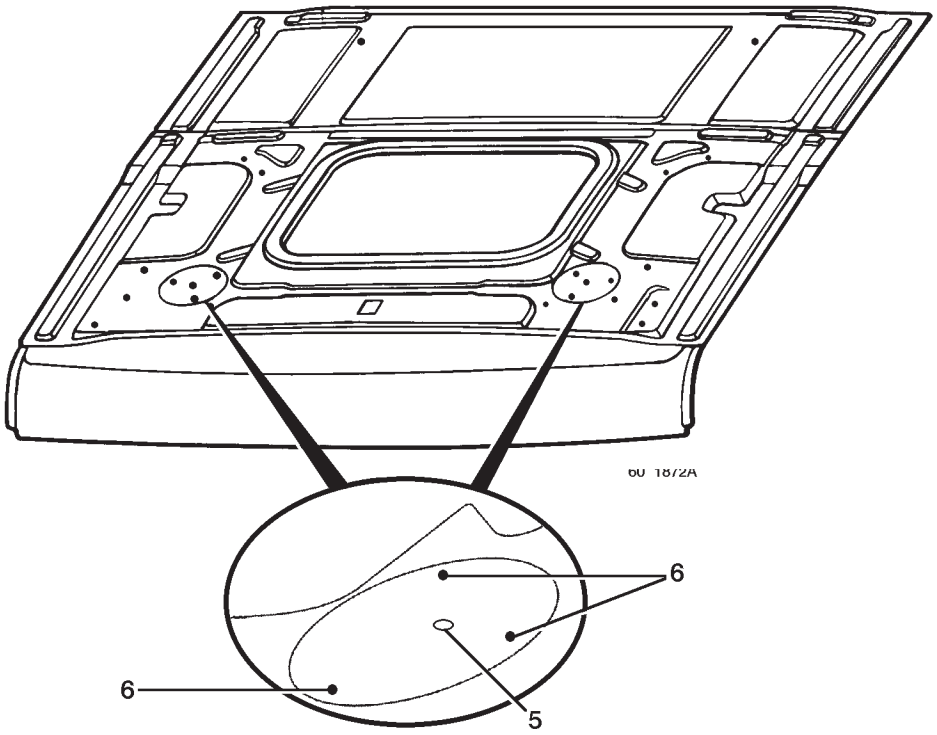
The wiring harness passages must be hermetically sealed. Use a wire grommet and sealing compound, if necessary



7.3.2 Installation of revolving beacons

- Wiring harness passage: at point (**5**), drill a hole diameter 35 mm.
- Revolving beacon fastening: at points (**6**), drill a hole diameter 7 mm.

The wiring harness passages must be hermetically sealed. Use a wire grommet and sealing compound, if necessary.

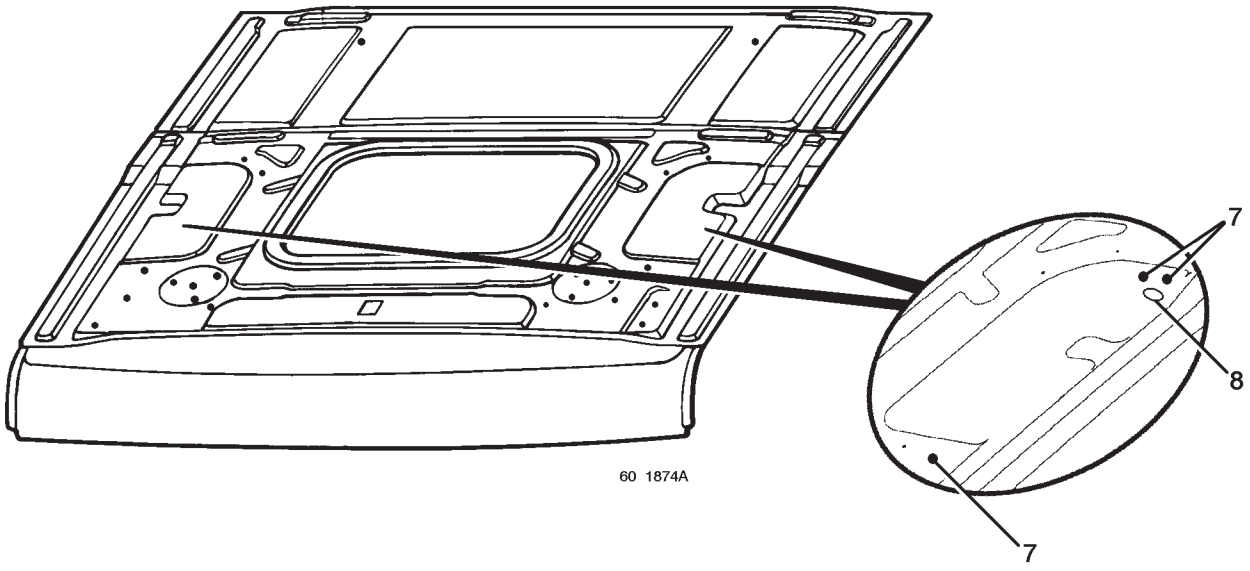


7.3.3 Installation of air horns

- Horns fastening: at points (**7**), drill a hole diameter 7 mm.
- Compressed air pipes passage: at point (8), drill a hole diameter 16.5 mm.

For positioning the drilling points (**7-8**), use the template provided for that purpose in the horns assembly kit.

The compressed air pipes passage must be hermetically sealed. Use a wire grommet and sealing compound, if necessary.



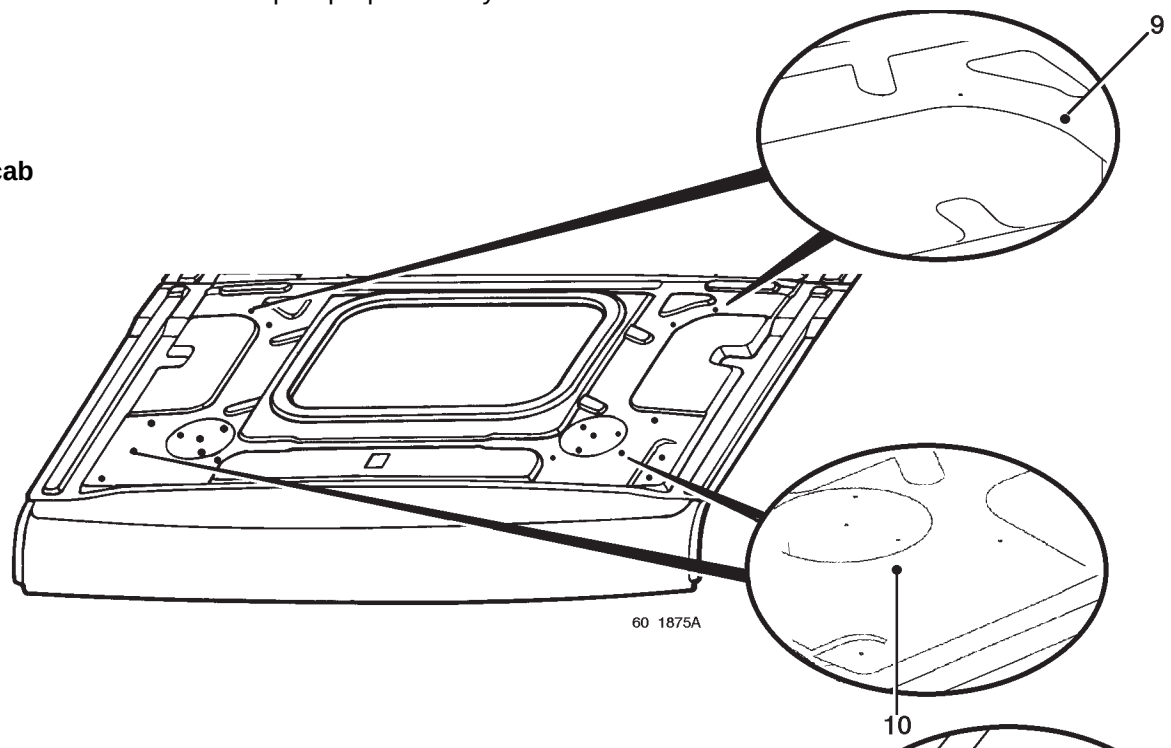
7.3.4 Installation of roof deflector

Impressions (**9-10-11-12**) locate the deflector fastenings. Nuts are welded to the roof stiffener if the vehicle is provided with a gantry as standard. If it is not, it is essential to use the clamping segments supplied with the deflector assembly kit. Drill holes diameter 12.5 mm at points (**9-10**) or (**11-12**).

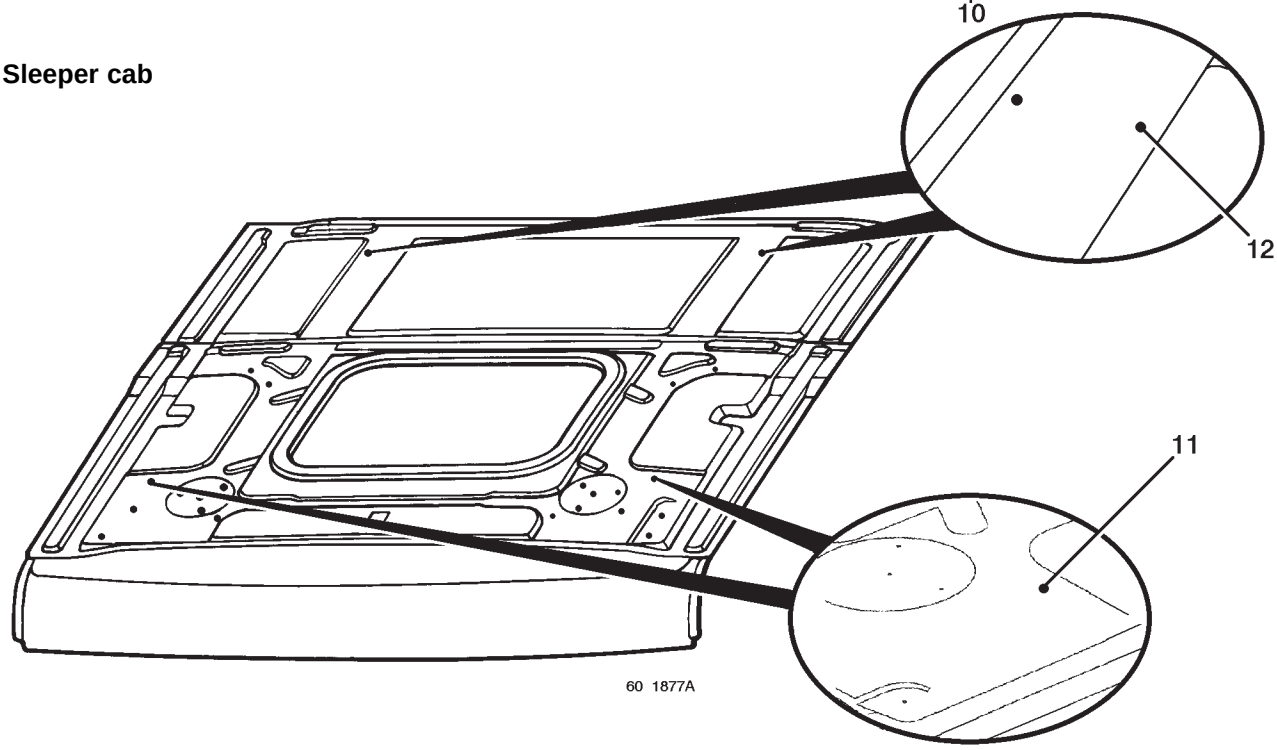
Note
Assembly of the roof deflector is incompatible with the presence of a gantry.

Upon reception of vehicles fitted with a deflector as standard, do not forget to remove the wooden board to be found inside the deflector.
This is used for transport purposes only.

Day cab



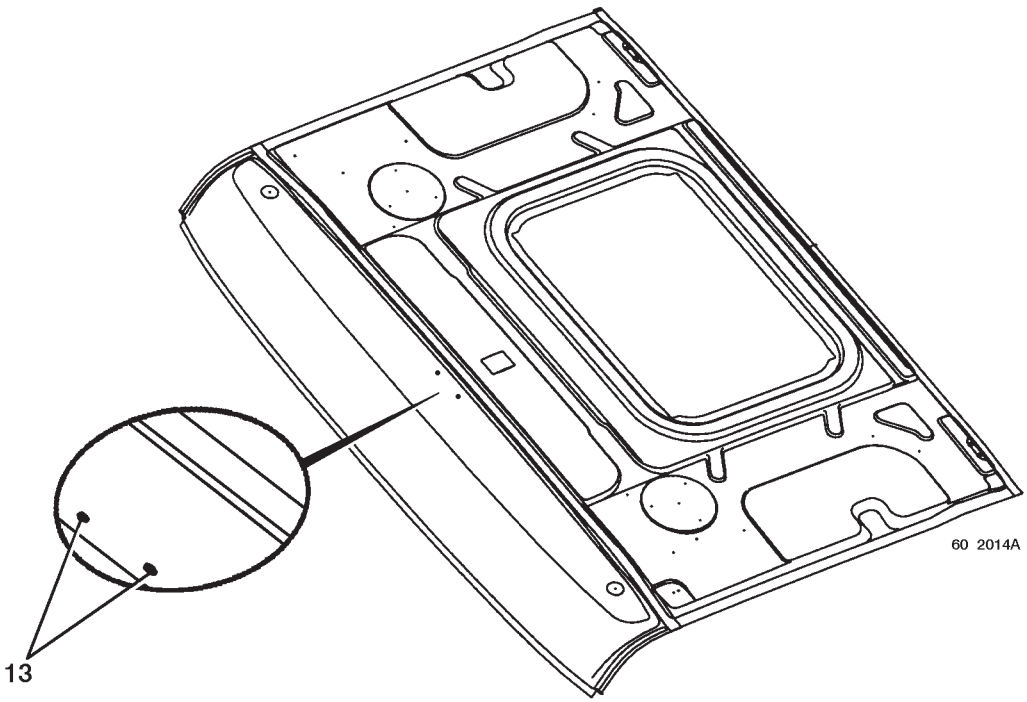
Sleeper cab



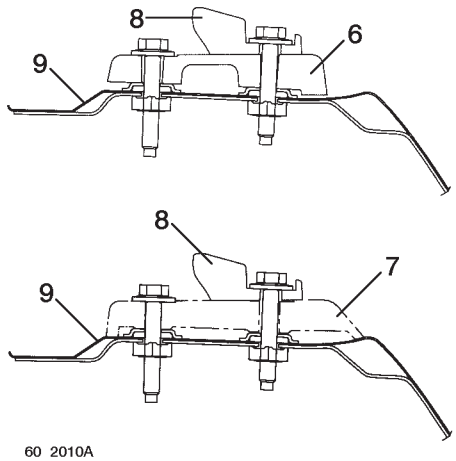
7.3.5 Installation of frontview mirror

Assembly of a frontview mirror is possible if the standard vehicle is equipped with gantry and/or sunshade.
If the vehicle is equipped with gantry and/or sunshade, there are fastening drillings on the existing canopy.
The frontview mirror base-plate takes the place of the gantry fastening spacer.

If the vehicle is not equipped with gantry, drillings (13) must be made in the canopy.
Drilling diameter: 12.5 mm.

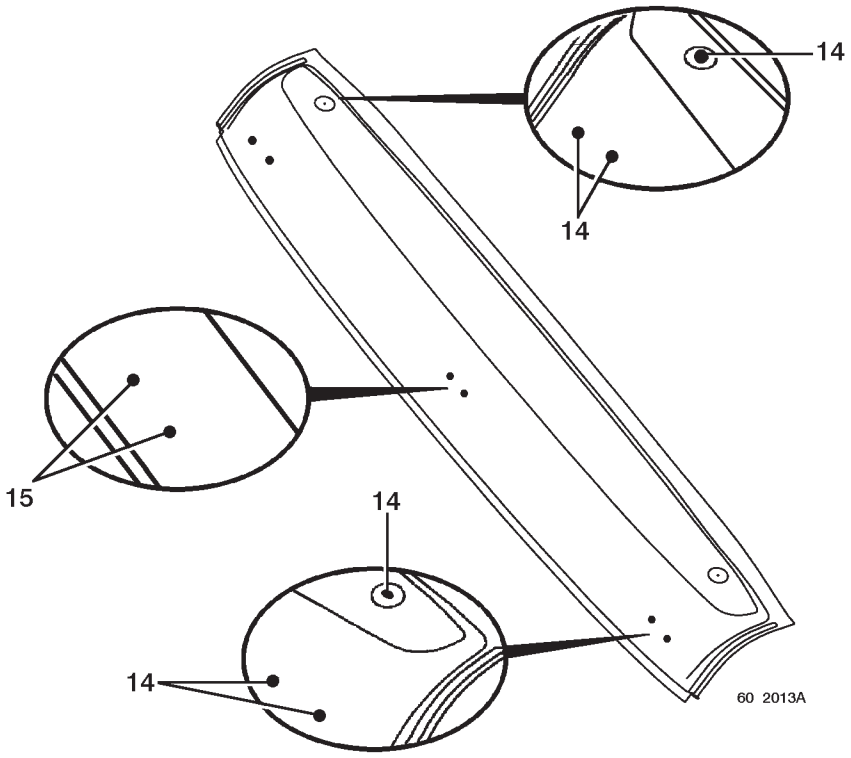


Assembly of a frontview mirror on vehicle equipped with a gantry:
The spacer (**6**) located on the central front fixing point (**8**) of the gantry is to be removed before installing the frontview mirror on the roof (**9**). The frontview mirror base-plate (**7**) plays the part of spacer.



7.3.6 Installation of sunshade

Assembly of the sunshade is possible if the standard vehicle is equipped with gantry and/or frontview mirror.
Drillings to be made on the canopy:
14 - 2 drillings Ø 12.5 mm.
15 - 6 drillings for fitting sealed crimping nuts M8.



7.3.7 Installation of gantry

The gantry can only be assembled as replacement for the deflector on the following assemblies:
- deflector and sunshade,
- deflector and frontview mirror,
- deflector, sunshade and frontview mirror.

The gantry allows a maximum loading weight of 30 kg to be supported.

Fastening the gantry:
- At points (16-17), make drillings diameter 12.5 mm.

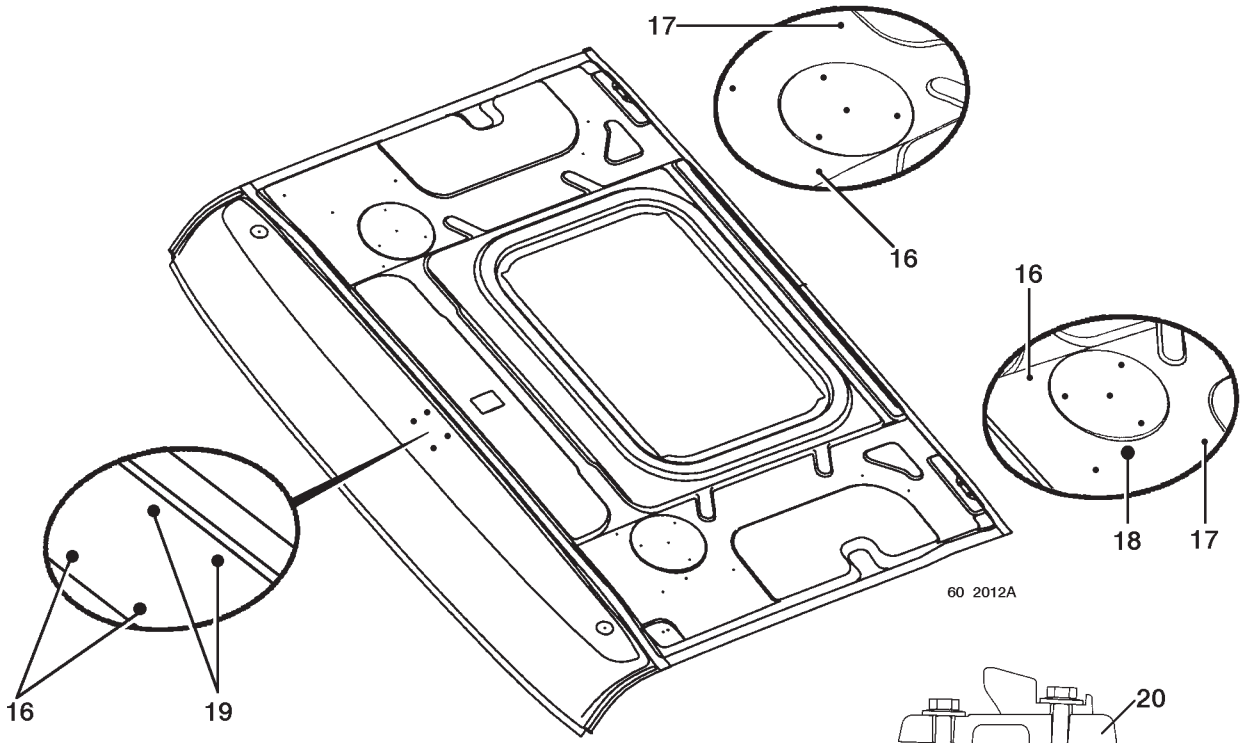
Wiring harness passage aperture:
- At point (**18**), make a drilling diameter 27 mm to allow passage of the wiring harness.

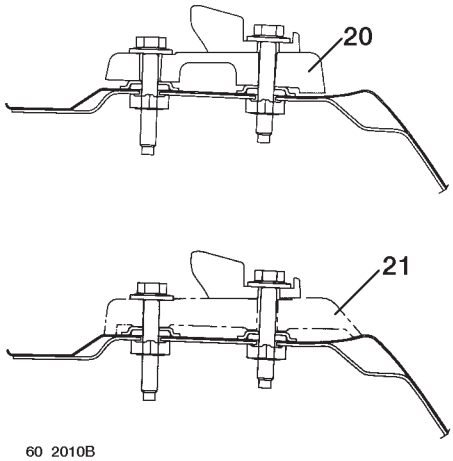
Passage (**18**) of the wiring harness must be hermetically sealed. Use a wire grommet and sealing compound, if necessary.

Note
Holes (**19**) already exist.
Holes (**17**) exist on sleeper cabs in the case of replacement of a deflector by a gantry.

IMPORTANT
All the unused deflector fixing holes must be blanked off with M8 screws and sealed washers.

Assembly of a gantry equipped with a frontview mirror:
Do not assemble spacer (**20**) as the frontview mirror base-plate (**21**) does the same job.



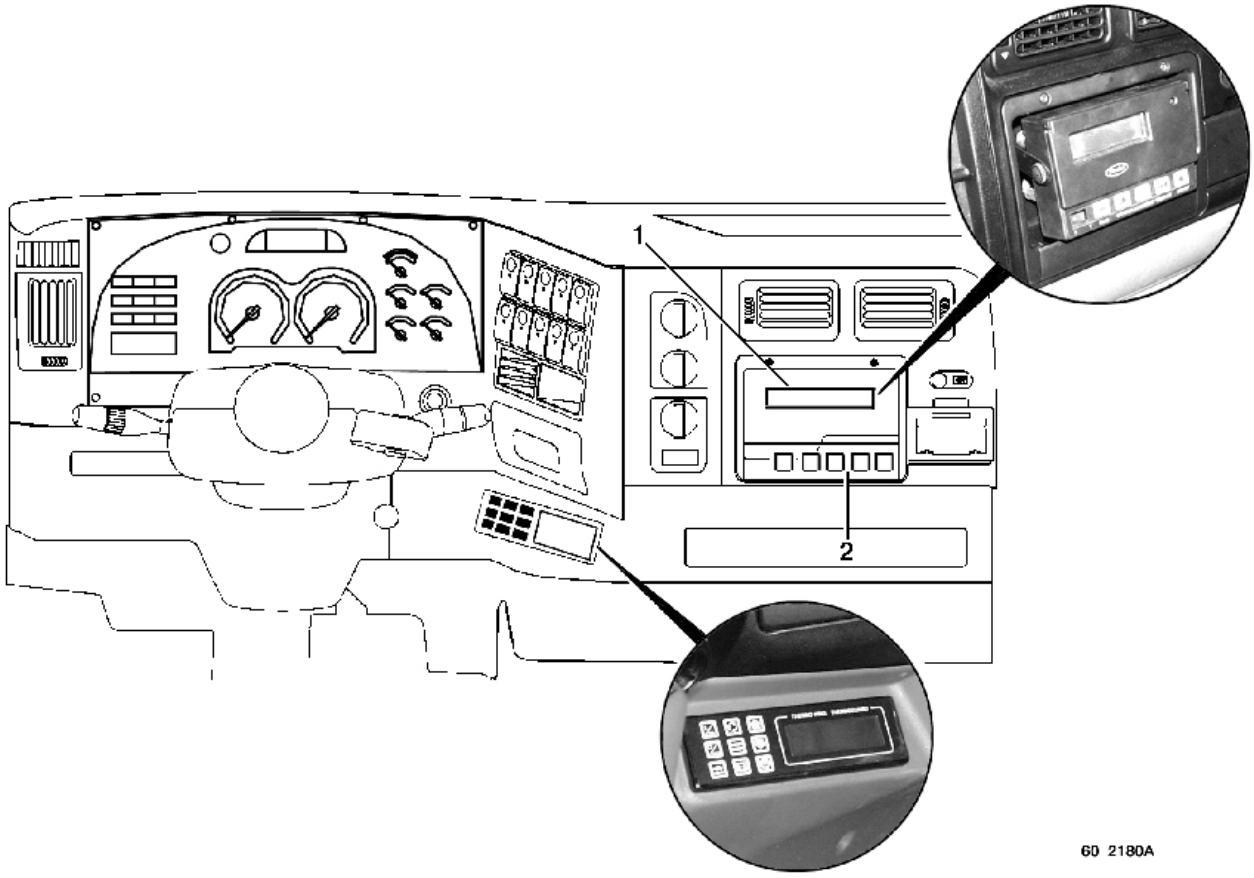


7.4 Assembly of accessories in cab

The cab is provided with several fixing points for the installation of cab equipment and various storage and stowage spaces.

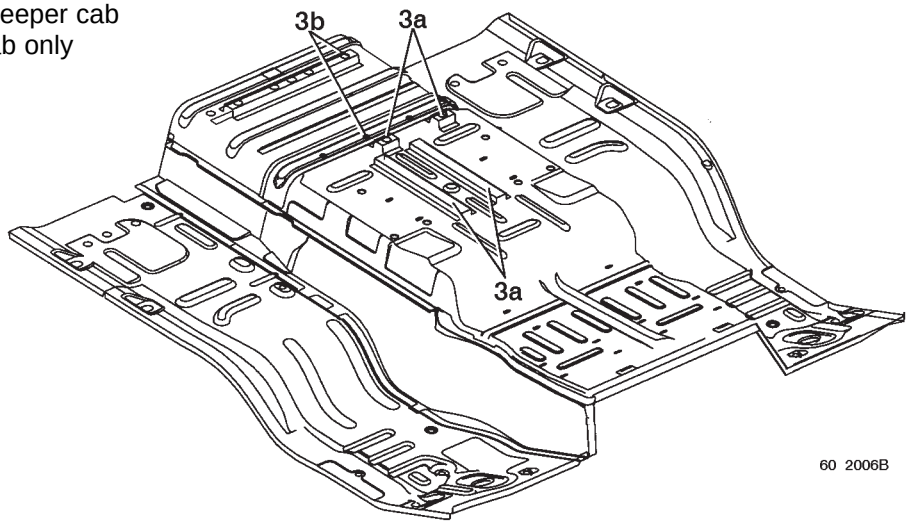
7.4.1 Location in dashboard

Housing (**1**) allows stowage of rectangular equipment items.
Remove the partition (**2**), if necessary.
In the event of absence of pneumatic switches (**3**), this location is available for stowing equipment (control box).



7.4.2 Location on engine tunnel

In the case of absence of a storage locker and front bench seat on the engine tunnel, mountings (3) can be used.
3a - day and sleeper cab
3b - sleeper cab only



8. AIRBAG

Depending on your vehicle's equipment

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

8.1 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).

8.2 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 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 driver, with his back against the squab, should hold the steering wheel with his arms slightly bent.*
- *The protective cover (1) must be free from any article (ledge, clock, adhesive, various accessories...).*
- *There should be no objects within the airbag deployment area (Ø 80 cm).*
- *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 V.I. 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 15 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.*