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- **Printed 692.68.910 – 2 Ed. – Base 04/2018**
INTRODUCTION

This publication provides information, features and instructions for transformation and fitting of the vehicle; considering the type of content, it is meant for qualified and specialized staff.

The bodybuilder is manager of the project and its execution, and must ensure compliance with what is set forth in this publication and in the laws in force.

Any modification, transformation or fitting not described in this manual and not expressly authorized will relieve IVECO of any liability and the warranty, if present, will immediately be null and void.

The same applies to individual assemblies and components; those described in this manual have been deliberated, approved and tested by IVECO and are part of normal production. The adoption of any type of unit that is not approved (e.g. PTO, tyres, horns, etc.) shall relieve IVECO of any responsibility.

IVECO is available to provide information on the implementation of the interventions and to provide instructions for any cases and situations not covered in this publication.

Before performing any operation, it is necessary to:

- verify that you have the manuals for the vehicle model on which you are about to work;
- ensure that all the safety devices (goggles, helmet, gloves, shoes, etc.), as well as the equipment used for work, lifting and transport, is available and working;
- ensure that the vehicle is safe, also with regards to the high voltage equipment.

At the end of the operation, the operational, efficiency and safety conditions set by IVECO must be restored. Contact the Service network for vehicle calibration if necessary.

Data and information contained in this publication may be outdated as a result of changes adopted by IVECO, at any time, for technical or commercial reasons or due to the need to adapt the vehicle to new legal requirements.

In the event of discordance between the information herein and the actual vehicle, please contact the Product Manager operating on the market before performing any interventions.

SYMBOLS - WARNINGS

<table>
<thead>
<tr>
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<th>Description</th>
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<tr>
<td>!</td>
<td>Danger for persons</td>
</tr>
<tr>
<td>!</td>
<td>Failure to comply with these prescriptions can result in the risk of serious injury.</td>
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<tr>
<td>!</td>
<td>Risk of serious damage to the vehicle</td>
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<tr>
<td>!</td>
<td>Partial or complete non observance of these prescriptions can lead to serious damages to the vehicle and can sometimes result in the guarantee being voided.</td>
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<tr>
<td>!</td>
<td>General danger</td>
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<tr>
<td>!</td>
<td>Includes the dangers of both above described signals.</td>
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<td>!</td>
<td>Environmental protection</td>
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<td>!</td>
<td>Indicates correct behaviour in order that vehicle use is as environmentally friendly as possible.</td>
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<td>Indicates an additional explanation for a piece of information.</td>
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INTRODUCTION

Within the Daily range, the electric drive version represents a contribution for a transport system which fully respects the environment.

The differences compared to conventional drive systems lead to increased technical complexity which must be taken into consideration when studying both the outfitting and, above all, the implementation.

In addition to the shared CAN lines and the 12V service line, electric drive vehicles also have a high voltage electric line (approx. 370V DC) and a 380V AC three-phase power supply line for charging the energy accumulation system.

The energy accumulation system consists of 2 or more (up to 4) modules connected in parallel; each module has a nominal voltage which is the same as that of the high voltage system.

The traction battery together with a super-capacitor (supercap) represents the energy reservoir required for the traction and power supply of the auxiliary systems.

All the auxiliary systems are actuated by electric motors, controlled by specific converters which work at high or low voltage.

Note  IVECO designs, approves and constructs electric vehicles which comply fully with the Regulation UNECE 100 currently in force. Interventions which:

a) use components other than original parts (even if type-approved as Separate Technical Unit),
b) modify the architecture of the original electrical system

require re-approval of the vehicle.

In this case, the designated Authority may require the complete documentation (calculations, diagrams, test reports) certifying compliance with the requirements of Regulation UNECE 100 for all the modifications made to the original system.

The financial cost involved in reapproving a vehicle are borne by the bodybuilder.
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GENERAL INFORMATION
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GENERAL INFORMATION

1.1 SCOPE OF THE GUIDELINES

The scope of this publication is to provide information, features and instructions for fitting and transformation of the original IVECO vehicle in order to ensure its functionality, safety and reliability.

These Guidelines also aim to indicate to bodybuilders:

- the quality level to be obtained;
- obligations regarding the safety of operations;
- obligations regarding the objective responsibility of the product.

It should be noted that the collaboration with IVECO is based on the assumption that the bodybuilder uses the maximum of their technical and organisational skills and that operations are technically and perfectly complete. As outlined below, the topic is extensive and we can only provide the rules and minimum precautions that can allow development of the technical initiative.

Faults or defects caused by total or partial failure to comply with these Guidelines are not covered by the guarantee on the chassis or relative mechanical units.

1.2 TECHNICAL DOCUMENTATION AVAILABLE ELECTRONICALLY

On the website www.ibb.iveco.com the following technical documentation is available:

- Guidelines for transformation and fitting of vehicles;
- technical specifications;
- vehicle diagrams;
- chassis diagrams;
- other range-specific data.

Requests to access the site must be made exclusively at www.ibb.iveco.com.

1.3 IVECO AUTHORISATION

Modifications or versions indicated in these Directives and carried out in full compliance of the instructions provided, do not require any specific authorisation.

If this is not the case, IVECO authorisation is required to carry out:

- particular changes to the wheelbase;
- work on the braking system;
- modifications to the steering system;
- modifications to the stabilizer bars and suspensions;
- modifications to the cab, cab mounts, locking and tilting devices;
- replacing the engine or the "driveline" with electric motor or hybrid systems;
- applications of retarders;
- power take-off applications;
- tyre size variations;
- modifications to the coupling parts (hooks, articulations);
- modifications to the electrical drive system in general and in particular, those relating to high voltage systems (orange wiring).
1.4 AUTHORIZATION REQUEST

Authorisation requests, when necessary, must be sent to the responsible IVECO Departments on the market. The bodybuilder must provide vehicle data (cab, wheelbase, overhang, chassis No.) and adequate documentation (drawings, calculations, technical report, etc.) showing the realisation, use and operating conditions of the vehicle. The drawings should evidence everything that differs from these instructions.

Upon completion of the interventions the bodybuilder shall be responsible for attainment of definitive approval from the competent authority.

1.5 RESPONSIBILITIES

The authorisations issued by IVECO are exclusively related to the technical/conceptual feasibility of the modification and/or fitting. The bodybuilder is therefore responsible for:

- the design;
- the choice of materials;
- the implementation;
- the compliance of the design and implementation to any specific indications provided by IVECO and the laws in force in the countries where the vehicle is destined;
- effects on functionality, safety, reliability and, in general, good behaviour of the vehicle;
- the supply of spare parts for a minimum period of 10 years starting from the last fitting of an order and for all pieces and components that are installed.

1.6 LEGISLATIVE REQUIREMENTS

The bodybuilder must verify that the final product is compliant, without exception, to all applicable legal requirements, on the municipal/autonomous/national level of each State in which it is registered and/or will circulate (Highway code, Official Regulations, etc.) and on the international level (European Union Directives, ONU/Geneva ECE Regulations, etc.). It is also necessary to comply with all requirements for accident prevention, instructions for assistance, the environment, etc.

The regulations on accident prevention or the legal indications cited in these Guidelines may be considered the most important, but are not meant in any way to replace or eliminate the obligation and responsibility of the bodybuilder to stay properly informed.

For this reason, IVECO shall not be held liable for any consequences due to errors caused by insufficient knowledge or incorrect interpretation of the legal provisions in force.

1.7 MULTI STAGE TYPE APPROVAL - COLLABORATION (only for vehicles registered in the EU, Switzerland and Turkey)


This procedure requires that each manufacturer is responsible for the approval and compliance of the production of systems, components and “separate technical units” produced by the same or applied to the vehicle.

The manufacturer of the vehicle is defined as first-stage manufacturer, while the bodybuilder is defined as Second-stage manufacturer or that of the next stage.
NEW DAILY ELECTRIC – GUIDELINES FOR BODYBUILDERS

GENERAL INFORMATION

1.8 GUARANTEES

Figure 1

1. IVECO
2. Authorised workshop upon Dealer order
3. Bodybuilder
4. Customer

Based on this Directive, IVECO (main vehicle manufacturer) and a bodybuilder intending to launch the multi-stage approval process must sign a specific Collaboration Contract, called Technical Agreement, which sets out the content and reciprocal obligations in detail.

Consequently:

1. IVECO has the responsibility of providing, in the agreed form, the approval documents (EC/ECE approvals) and the technical information necessary for the proper implementation of the fitting and/or transformation (manuals, drawings, specifications);
2. the bodybuilder has the following responsibilities:
   - the design and implementation of modifications to the basic vehicle received from IVECO,
   - reattainment of approvals of systems already approved in a previous stage when, due to changes on the basic vehicle the approvals need to be updated,
   - compliance with national/international laws and in particular the laws of the destination country, for all changes made,
   - presentation of the changes made to a technical service, for evaluation,
   - appropriate documentation of the changes made, in order to give objective evidence of compliance to the aforementioned provisions of law (e.g. approval documents/test reports).

Before signing the Technical Agreement IVECO reserves the right to visit the bodybuilder, in order to verify qualifications to carry out the fittings and/or processing for which the above collaboration is requested.

The contents of the Technical Agreement can be evaluated in detail upon request to the Manager for relations with the bodybuilder for the single Market.

1.8 GUARANTEES

The guarantee that the work has been performed to standard must be given by the bodybuilder who made the superstructure or modifications to the chassis, in full compliance with the instructions in these Guidelines.

IVECO reserves the right to void the guarantee on the vehicle, if:

- unauthorised fittings or transformations have been carried out;
- a chassis not suitable for the fitting or intended use has been used;
- the standards, specifications and instructions, provided by IVECO for proper execution of the work, have not been respected;
- original spare parts or components made available by IVECO for specific operations have not been used;
- safety regulations have not been respected;
- the vehicle is used for purposes other than those for which it was designed.
NEW DAILY ELECTRIC – GUIDELINES FOR BODYBUILDERS

GENERAL INFORMATION

1.9 QUALITY SYSTEM MANAGEMENT

IVECO has always promoted the training and development of a Quality System for bodybuilders. This requirement is not only due to regulations on product liability, but also to the increasingly higher quality level demands, new organizational forms in various sectors and the search for more advanced levels of efficiency. IVECO therefore considers it appropriate for bodybuilders to be equipped with:

- organizational charts for roles and responsibilities;
- quality objectives and indicators;
- design technical documentation;
- process documentation, including controls;
- plan for product improvement, also obtained through corrective actions;
- post-sales assistance;
- training and qualification of staff.

The availability of ISO 9001 certification, even though not required, is considered very important by IVECO.

1.10 ACCIDENT PREVENTION

Do not allow unauthorised personnel to intervene or operate on the vehicle. It is forbidden to use the vehicle with safety devices that have been tampered with or are damaged.

- Structures and devices installed on the vehicles must comply with the applicable regulations for accident prevention, and with safety regulations required in the individual countries where the vehicles are used.

All precautions dictated by technical knowledge must be taken to avoid damage and functional defects. Compliance with these requirements must be overseen by the manufacturer of the structures and devices.

- Seats, coatings, gaskets, protective panels, etc., may pose a fire hazard when exposed to an intense heat source. Remove them before working with welding and with flames.

1.11 CHOICE OF MATERIALS TO USE: ECOLOGY - RECYCLING

In the study and design phase, the choice of materials to be used by be made carefully, even from the ecological and recycling point of view.

To this regard, please note that:

- it is forbidden to use materials that are harmful to health, or at least which may pose a risk, such as those containing asbestos, lead, halogen additives, fluorocarbons, cadmium, mercury, hexavalent chromium, etc.;
- it is advisable to use materials whose processing produces limited waste quantities and allows easy recycling after first use;
- in synthetic materials of the composite type, it is advisable to use components that are compatible with each other, allowing use with the possible addition of other recovery components. Prepare the required markings in accordance with the regulations in force;
- the batteries contain substances that are very dangerous for the environment. To replace the batteries it is possible to go to the Service Network, equipped for disposal in accordance with the nature and the law.

- To comply with Directive 2000/53 EC (ELVs), IVECO prohibits the in-vehicle installation of components that contain lead, mercury, cadmium and hexavalent chromium; exceptions are made in cases allowed by Annex II of the above Directive.
I.12 VEHICLE MANAGEMENT ON THE PART OF BODYBUILDER

Transport of the vehicle

Ramps of the car transporter vehicle must be sufficiently long to allow correct loading/unloading and avoid impact or rub against the ground of the battery pack positioned on the rear overhang of the vehicle.

**Note** The angle of the ramp must not exceed 9° or, in general, have a length of the retracting ramp of at least 3 metres (depending on the height of the car transporter vehicle's flat body).

![Figure 2](image.png)

**Note** If the battery gets completely exhausted during the journey, the vehicle is not able to move under its own power and must be unloaded using the winch of the car transporter vehicle.

Acceptance of chassis

The bodybuilder receiving a chassis/vehicle from IVECO or from a Dealer must perform a preliminary check, notifying of any missing accessories or damage attributable to the transporter.

Maintenance

To preserve the chassis/vehicle in its full efficiency, even while parking in the warehouse, maintenance operations may be necessary within a predetermined time.

The expenses for carrying out these operations are borne by the owner of the vehicle in that moment (Bodybuilder, Dealer or Customer).

Delivery of the vehicle to the final customer

Before delivering the vehicle, the bodybuilder must:

- calibrate its production (vehicle and/or equipment) and verify functionality and safety;
- for items which will be subjected to the intervention, carry out the controls set out in the Pre Delivery Inspection (PDI) list, available in the IVECO network;
- carry out a functional road test (in case of vehicle transformation). Any defects or problems should be notified to the IVECO Assistance Service to verify conditions for inclusion in the PDI costs;
- prepare and deliver to the final Customer the necessary instructions for service and maintenance of the fitting and any added units;
- report new data on special labels;
- provide confirmation that the operations carried out comply with the indications of the vehicle Manufacturer and legal requirements;
- draw up a guarantee covering the changes made.
### 1.13 VEHICLE NAMES

The commercial name New Daily Electric does not correspond to the type-approval name, a complete example of which is indicated below.

#### Type approval name

**DAILY 50C 80E /P**

- **DAILY** – Vehicle name
- **50** – Gross mass - GVW (no/10 = weight in t)
  - 35
  - 3.5 t
  - 50
  - 4.5 - 5.2 t
- **C** – Rear wheels
  - S
    - Single rear wheels
  - C
    - Twin rear wheels
- **80** – Engine power (in kW)
  - 60
    - Electric motor 60 kW
  - 80
    - Electric motor 80 kW
- **E** – Engine type
  - E
    - Electric motor
- **/ P** – Rear pneumatic suspensions

### 1.14 IDENTIFICATIONS

Logos, identification tradenames and nameplates must not be modified, displaced or removed since the original design appearance of the vehicle must be safeguarded.

The application of trademarks relating to the transformation or outfitting must be authorised. They must not be applied near to the IVECO tradenames or logos.

In the event of cowl vehicles, the positioning of the IVECO logo on the engine bonnet must be done only after final paint spraying and must respect the measurements indicated qualitatively in the following figure.

![Figure 3](image)

1. Front view
2. Side view

   a. Bonnet lower edge

For the actual measurements and for the realization of a possible template, please consult the design 5801 620982.
IVECO reserves the right to withdraw its tradenames and logos if the above requirements are not met.

1.15 DIMENSIONS AND GROUND

General information
The dimensions and masses of vehicles allowed on the axles are shown in the drawings, the technical descriptions and, more generally, on the documents on the official IVECO website. Defects refer to vehicles in their standard versions; the use of special equipment may lead to changes on the masses and their distribution on the axles.

For the New Daily Electric version, this information can be obtained by contacting IVECO directly.

Weighing of the chassis
It should be noted that variations are possible on the masses of the order of 5%.

For this reason, before carrying out the fitting, it is a good idea to determine the mass of the chassis cab vehicle and its distribution on the axles.

Vehicle adaptability
The body length limits mainly depend on:

- wheelbase length
- distribution of mass on the axles
- maximum permitted width.

On DAILY E6, this width is 2550 mm.

Rear-view mirrors
Depending on the width of the version, the rear visibility angles imposed by the Regulations can be respected choosing the most appropriate of the three rear-view mirrors with arms of varying widths available in the catalogue (opt. 8643, 8644, 76129).

Determination of the centre of gravity of the superstructure and the payload
To determine the position of the centre of gravity of the superstructure and of the payload, proceed according to the following examples.

The specific technical documentation for each model (chassis cab version diagram) illustrates the positions allowed with the standard version vehicle. The masses and the positioning of the individual components of the vehicle are shown on the chassis and weight allocation diagram.
**W** = Payload plus superstructure

**W1** = Measurement of payload on front axle

**W2** = Measurement of payload on rear axle

**L1** = Distance of centre of gravity from centre line of rear axle

**L** = Actual wheelbase

For the purposes of payload distribution on the axles, it is assumed that this is evenly distributed, except in cases in which the shape of the load surface results in a different load distribution.

For equipment, the centre of gravity is obviously considered for its actual position.

In the realisation of the superstructure or containers, automated loading and unloading of the goods transported must be provided to avoid excessive variations of the distribution and/or excessive loads on the axles, providing information for users if necessary.

The bodybuilder should also provide a suitable anchoring systems for the load on the superstructure, so that transport can occur in maximum security.
Even distribution of load

Uneven distribution of load (attention to loads on axles and minimum ratio)

**Height of centre of gravity**

For the chassis cab version and no-load vehicle, the value of the height of the centre of gravity is shown on the specific technical documentation for each model (chassis cab version diagram).

For the New Daily Electric version, this information can be obtained by contacting IVECO directly.

For the vehicle complete with superstructure and full load, this height must comply with the maximum values allowed by national or international standards, in particular, Directives ECE 13 on longitudinal stability and ECE 111 on lateral stability while driving.

The following cases should be distinguished:

- fixed loads,
- loads that result in increased aerodynamic actions.

a) Fixed loads
1.15 DIMENSIONS AND GROUND

**Control at full load**

\[
\begin{align*}
H_v &= \text{Vehicle centre of gravity height (loaded)} \\
H_s &= \text{Height of payload centre of gravity from the ground} \\
H_t &= \text{Complete full-load vehicle centre of gravity height} \\
W_v &= \text{Vehicle tare weight} \\
W_s &= \text{Payload} \\
W_t &= \text{Complete vehicle ground at full load}
\end{align*}
\]

\[
H_t = \frac{W_v \cdot H_v + W_s \cdot H_s}{W_v + W_s}
\]

\[
H_s = \frac{(W_v + W_s) \cdot H_t - W_v \cdot H_v}{W_s}
\]

For any inspections with the vehicle set up without payload you can proceed similarly, assuming \(W_s\) is only the tare weight of the superstructure (considering for \(H_v\) a value appropriate for the load and between the no-load chassis cab version trim and the full-load trim).

**Note** For New Daily Electric it is not possible to precisely define the centre of mass as it is heavily influenced by the presence and number of the traction battery modules.

**b) Loads which indicate high aerodynamic actions**

In fittings characterised by high vertical and surface development (e.g.: advertising panelling), the height of the centre of thrust, determined in the case of cross-wind, must be evaluated very carefully.

![Warning](https://example.com/warning.png)

Even with the low centre of gravity, a vehicle fitting that has a high surface area may not provide sufficient lateral stability and may be exposed to the danger of tilting.

Special attention must therefore be paid:

- in defining the height of the fitted vehicle’s centre of gravity and at full load,
- in assessing the aerodynamic forces,
- in prescribing the adoption of adequate precautions for driving.

Any cases where evaluation is difficult should be submitted to IVECO for approval.
Respect of the permitted masses

All the limits shown on IVECO documentation must be respected. It is particularly important to evaluate the maximum ground on the front axle in any load condition, in order to ensure the necessary steering features in all road surface conditions.

Special attention must therefore be paid to vehicles with concentrated load on the rear overhang (e.g.: cranes, tail lifts, trailers with centre axle) and short wheelbase vehicles and high centre of gravity.

<table>
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<th>Note</th>
<th>Respect of the permitted masses</th>
<th>Note: In the positioning of the auxiliary bodies and superstructure, a proper load distribution in the transverse direction must be ensured. A variation on the nominal load may be permitted for each wheel (50% load on the corresponding axle) of ±4% (e.g.: load allowed on the axle 3,000 kg; allowed for each wheel side from 1,440 to 1,560 kg) in compliance with what is permitted by the tyres, without affecting the braking and driving stability characteristics of the vehicle. Unless other specific dispositions are provided for individual vehicles, one must consider for the mass on the front axle a minimum value of 25% of the effective mass of the vehicle (with loads distributed uniformly as well as with loads on the rear overhang or associated with a trailer, if attached).</th>
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The rear overhang of the superstructure must be implemented in full compliance with the permitted axle loads, the minimum load required on the front axle, length limits, the position of the tow hook and the under-run protection as envisaged by various standards and regulations.

Variations on permitted masses

Special exemptions from the maximum permissible masses may be granted for specific uses, for which, however, there are precise limits for use and reinforcements to be made to parts of the vehicle.

These exceptions, if they exceed the limits of the law, must be authorised by the Administrative Authority.

In the authorisation request, you must indicate:

- type of vehicle, wheelbase, chassis number, intended use;
- division of the tare weight on the axles (in fitted vehicles, e.g.: crane with flatbed), with the position of the payload centre of gravity;
- any proposals for strengthening the parts of the vehicle.

Reduction of the permitted mass on vehicles (declassing) can require interventions on some parts, such as suspensions and brakes; in these cases the necessary indications may be provided.

**The bodybuilder is responsible for planning the outfitting with the final number of traction batteries.**

### 1.16 INSTRUCTIONS FOR PROPER FUNCTIONING OF THE VEHICLE PARTS AND ACCESSIBILITY

In carrying out the transformations and applying any type of equipment, there should be no alteration to what enables the proper functioning of the vehicle units and parts under various working conditions.

For example:

- free access must be guaranteed to the places that need inspection, maintenance or periodic controls (e.g., battery replacement, access to the air suspension compressor) and, in the case of enclosed superstructures, special compartments and doors should be provided;
- the possibility of disassembling the various groups for assistance operations must be maintained; for New Daily Electric, access to all the electrical panels/connectors of the electric drive system must be guaranteed;
- in the fitting that provides the tipping of the lateral tails, consider the size of the most protruding parts of the vehicle, in order to avoid limitations to tipping or damage to the parts.
- cooling conditions must not be altered (front grille, air passages, etc.);
the soundproofing panels must not be altered or moved so as not to affect the approved sound emission limits. If any openings need to be made (e.g. for the passage of pipes or added sections), they must be thoroughly closed, using fireproof and soundproofing materials equivalent to the original materials used;

- adequate ventilation must be maintained for the brakes and battery casing (particularly in the execution of truck bodies);
- in the placement of mudguards and wheel arches, free shaking of the rear wheels must be guaranteed, even under the conditions of use with chains;
- adjustment of the vehicle’s headlamps must be checked once construction is completed, to correct any changes in their structure; for adjustment, proceed according to the instructions given in the "Use and Maintenance Handbook";
- for any elements supplied loose (e.g. spare wheel, chocks), the bodybuilder must position and fasten them in an accessible and secure way, in compliance to any national regulations.

I.17 GENERAL SAFETY STANDARDS

The reference standard for operating on electric vehicles is ISO 6469: Electrically propelled road vehicles -- Safety Specifications. Particular attention must be paid to prevent the spillage of hydraulic fluids or flammable liquids above components which may become hot or overheated. Therefore, when the pipes have to be installed in the vicinity of heat sources, adequate isolating shields or protective plates must be included.

Moreover:

a) When recharging the batteries

When the vehicle is connected to the three-phase mains power network to charge the traction batteries, some electric circuits are live and therefore the interventions should be avoided. If it is essential that work is carried out on the vehicle, the charging cable must be disconnected.

b) Electrically powered vehicle

If the vehicle start sequence has been completed, no maintenance and/or verification operations can be carried out as the lines are powered. In this conditions, the powered panels and the engine bonnet must not be open. The hazardous points are marked with a decal showing a yellow triangle with a lightning bolt in the centre. Cables and conduits must not be touched with bare hands or with metallic objects which could create short circuits.

c) Parked vehicle

When start-up has not yet been completed, or the vehicle is charging, only some of the electronic control units are powered.

d) Vehicle in outfitting

During outfitting, all the high voltage components (marked with a yellow triangle with a bolt of lightning) must be electrically disconnected from each other and from the other systems on the vehicle. The relative connectors must be disconnected not less than one minute after the ignition key has been set to OFF with the charging plug already disconnected. If welding operations have to be carried out on the vehicle chassis or body, low-voltage components (electronic control units, display etc.) must also be disconnected, together with the yellow-green wires which guarantee the electrical equipotential between the metal cases of the components and the vehicle chassis.

e) Fire prevention

Particular attention must be paid to prevent the spillage of hydraulic fluids or flammable liquids above components which may become hot or overheated. Therefore, when the pipes have to be installed in the vicinity of heat sources, adequate isolating shields or protective plates must be included.

Also refer to the specific indications provided in the Use and Maintenance Manual.

f) In all operating conditions

The energy accumulation system consists of modules connected in parallel. The number of these modules can vary from two to four. Each module, with the exception of the super-capacitor, is equipped with a forced air cooling system; moved by means of a fan, the air is circulated inside the module and leaves via a vent connected to a stainless steel tube, in the direction of the ground. Fan operation is controlled by the battery and is not predictable a priori.
The FZ battery cooling air leaves at extremely high temperatures, which could cause burns. Do not obstruct the air inlet and outlet vents of the FZ battery modules. Do not touch the stainless steel pipes of the cooling system for the FZ battery modules. Do not use flammable material in the vicinity of the cooling pipes.

Diagram of the air flow to the individual fan

- **U**: Power supply voltage [V]
- **qv**: Air flow
- **Pfs**: Pressure increase

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<tr>
<th>Points in the diagram</th>
<th>no. [rpm]</th>
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<tbody>
<tr>
<td>1</td>
<td>5020</td>
</tr>
<tr>
<td>2</td>
<td>5165</td>
</tr>
<tr>
<td>3</td>
<td>5430</td>
</tr>
</tbody>
</table>
### GENERAL INFORMATION

#### 1.18 HOLDING AND RECHARGING

To maintain the charge and operating temperature, DAILY Electric must always be connected to a power socket using the special charging cable available as spare parts (P/N 42575031).

![Warning]

For each vehicle simultaneously being recharged it is mandatory to use a recharging socket with available power of at least 11 KW and the specific recharging cable.

The power sockets must be of the "5 pin (3P + N + E), IEC 60309-2" type, 32 A.

**Note** The simultaneous presence of vehicles connected to sockets nearby or with different electric loads may cause incompatible voltage drops; therefore before recharging make sure that the electrical mains network is suitable.

### Maintaining the charge

The vehicle is equipped with FZ-type traction batteries operating at high internal temperature (up to 320 °C). When the vehicle is not connected to the electric mains, the batteries use their energy to maintain the temperature as close as possible to the minimum operating temperature (approx. 255 °C).

On the basis of the ambient temperature, the batteries charged to 100% will discharge fully within 5 / 10 days; therefore, if there is no electric vehicle charging station near to where outfitting is being carried out and if the work times exceed the duration indicated above, work must be suspended once or more than once to allow the energy to be reintegrated and to allow the operating temperature to be maintained.

Vice versa, if the batteries are allowed to go 5 / 10 days without being recharged, they will no longer stay warm and will begin to cool down to ambient temperature.

If this condition occurs, the vehicle will no longer be able to move independently and will need to be towed (forklift truck, tractor, etc.).

To return the vehicle to full service, it must be connected to the electrical mains for at least 30 hours, of which at least 20 are required to return the battery system to the required temperature and 10 to recharge them.

---

<table>
<thead>
<tr>
<th>Points in the diagram</th>
<th>no. [rpm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5890</td>
</tr>
<tr>
<td>5</td>
<td>4720</td>
</tr>
<tr>
<td>6</td>
<td>4825</td>
</tr>
<tr>
<td>7</td>
<td>5030</td>
</tr>
<tr>
<td>8</td>
<td>5370</td>
</tr>
<tr>
<td>9</td>
<td>3635</td>
</tr>
<tr>
<td>10</td>
<td>3700</td>
</tr>
<tr>
<td>11</td>
<td>3825</td>
</tr>
<tr>
<td>12</td>
<td>4050</td>
</tr>
</tbody>
</table>

Air flow measured according to standard ISO 5801, installation category A.

The values indicated are valid in the measurement conditions indicated above, and can vary depending on the actual installation type.

Following any variation compared to the standard configuration, the specific values must be checked and verified with the installed unit.
Battery recharging procedure

- Turn the ignition key to STOP.
- Engage the handbrake.
- Open the cover of the charging socket on the driver’s side.

- Insert the specific recharging cable plug first into the socket on the vehicle and then the one on the recharging station.
- Wait for the recharge socket LEDs to turn green, then provide power through the charging station.
- The LED should turn yellow (recharging plug locked, vehicle not charging) and then red (recharging plug blocked and power present). This information is displayed on the dashboard.

Points of attention

1) If the procedure is not carried out correctly (e.g. starting to recharge without engaging the parking brake), the vehicle will signal this problem as follows:

- emergency lights activation;
- pedestrian acoustic alert system activation PAAS (Pedestrian Acoustic Alert System);
- message on the dashboard "charge not in progress, plug inserted AC not present".

- The contemporaneity of vehicle with plug inserted and alternating current not present could cause excessive discharge and damage to the traction batteries.

2) Button P on the driving mode selection lever activates/deactivates the pedestrian acoustic alert system (PAAS).
3) The main battery switch must not be pressed to open the traction battery contactors while charging. It must not even be mistaken for the emergency lights switch.

End of recharging

In case of complete charging the charging socket LED switches from red to yellow. The recharging operation can be interrupted at any time, even with partial charge. The procedure is identical, whether the procedure is interrupted with partial charging or at the end of the recharging:

- press the button on the central control panel;
- deactivate the switch on the charging station (if present), the recharging socket LED turns green;
- remove the recharging cable plug from the socket on the vehicle.
1.19 CONVENTIONS

In these Guidelines the following conventions are adopted:

- **Wheelbase**: distance between the centre lines of the first steering axle and the first rear axle (engine or not).
- **Rear overhang**: distance between the centre line of the last axle and the rear extremity of the chassis side members.
- **Dimensions A, B and t** of the chassis section: see the picture on the side.
SECTION 2

CHASSIS

INTERVENTIONS
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CHASSIS INTERVENTIONS

2.1 GENERAL CHASSIS MODIFICATION STANDARDS

Keep in mind that:

- **weldings on the supporting structures of the chassis are absolutely forbidden** (except as prescribed in Paragraph “Weldings” (Page 9) and in Chapters 2.4 (Page 14), and 2.5 (Page 14));
- **no holes may be drilled on the wings of the side members** (except for that stated in Chapter 3.3 - Paragraph "Choosing the type of connection" (Page 11));
- for cases where modifications to nailed unions are allowed, the nails may be replaced with flanged head screws or with hex head screws classed 8.8 with the next higher class diameter and nuts fitted with an anti-unscrewing system. Screws larger than M14 may not be used (maximum hole diameter of 15 mm), unless otherwise specified;
- for cases where unions that require screws are restored, the suitability of these screws must be checked before being reused, and they must be tightened to the appropriate torque;

⚠️ As regards remounting safety components, it is prohibited to re-use the same screws and tightening must be done at the specified torque (contact the Service Network for the value).

- for cases involving remounting of safety components where nails are replaced by screws, the union must be checked again after about 500 - 1000 km of travel.

Preventive measures

⚠️ During operations involving welding, drilling, grinding or cutting carried out near the brake pipes or wiring, always disconnect the battery to prevent damage to the electronic control units. It is also necessary to adopt appropriate measures to protect these pipes and cables, even including removal if necessary (respect the indications provided in Chapters 2.15 and 5.4).
Precautions for alternators and electric/electronic components

**Note**  On the New Daily Electric, disconnection of any electronic component, particularly high voltage components, must only take place after the key in the ignition block has been set to 0 for at least 1 minute, with the charging socket already disconnected.

If the electric drive system has to be started-up with external charging equipment, do not use the "Start" function (if present) in order to avoid peak currents which could damage electric and electronic components.

**Earth connection**

The original ground connections of the vehicle should never be altered; in cases where these connections must be moved or new ground points added, use the holes present on the chassis to the extent possible, taking care to:

- mechanically remove - either by filing and/or with a suitable chemical based solution - the paint on both the chassis and terminal side, thus creating a contact surface free of indentations and edges;
- paint the area between the terminal and metal surface with a suitable high conductivity paint;
- connect to ground within 5 minutes after application of the paint.

For ground connections at the signal level (e.g. sensors or devices with low absorption), absolutely never use standardised IVECO M1 points (ground connection of the batteries), M2 or M8 (grounding the starter motor, depending on the position of the guide) and connect the signal cable ground on points separate from the power cables and wires that serve as radio frequency screens.

Avoid ground connections between devices in a concatenated fashion for electronic equipment; install individual ground connections of optimal length (favour the shortest routes).

**Braking and electrical systems**

For additional details on the braking and electrical systems see Chapters 2.15 (➡ Page 27) and 5.4.

**Characteristics of the material used in chassis modifications**

For frame modifications on the vehicle (all models and wheelbases) and for applications of reinforcements on the side members, the material used must correspond to the original frame material in terms of quality and thickness (see Tables 2.1 and 2.2).

If it is not possible to procure materials of the thickness indicated, materials having immediately higher standard thickness may be employed.

**Table 2.1 - Material to be used in chassis modifications**

<table>
<thead>
<tr>
<th>Name of steel</th>
<th>Breaking strength [N/mm²]</th>
<th>Yield stress [N/mm²]</th>
<th>Elongation</th>
</tr>
</thead>
<tbody>
<tr>
<td>IVECO Fe E420</td>
<td>530</td>
<td>420</td>
<td>21%</td>
</tr>
<tr>
<td>Europe S420MC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany QStE420TM</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 2.2 - Section dimension and chassis thickness**

<table>
<thead>
<tr>
<th>Class</th>
<th>Type</th>
<th>Wheelbase [mm]</th>
<th>Rear overhang chassis [mm]</th>
<th>A × B × t Side member section wheelbase area [mm]</th>
<th>A × B × t Side member section rear overhang area [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>355/E</td>
<td>truck</td>
<td>3000</td>
<td>920</td>
<td>144 × 56 × 3</td>
<td>94 × 56 × 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3450</td>
<td>1355</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**NEW DAILY ELECTRIC – GUIDELINES FOR BODYBUILDERS**

**CHASSIS INTERVENTIONS**

2.2 **DRILLS ON THE CHASSIS**

<table>
<thead>
<tr>
<th>Class</th>
<th>Type</th>
<th>Wheelbase [mm]</th>
<th>Rear overhang chassis [mm]</th>
<th>A x B x t&lt;br&gt;Side member section wheelbase area [mm]</th>
<th>A x B x t&lt;br&gt;Side member section rear overhang area [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>35S/E</td>
<td>truck</td>
<td>3750</td>
<td>1655</td>
<td>144 x 56 x 3</td>
<td>94 x 56 x 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4100</td>
<td>1305</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>van</td>
<td>3000</td>
<td>840</td>
<td>144 x 56 x 3</td>
<td>94 x 56 x 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3520</td>
<td>840</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3520 long overhang</td>
<td>1240</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4100</td>
<td>1825</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35C/E - 50C/E</td>
<td>truck</td>
<td>3000</td>
<td>1240</td>
<td>174 x 70 x 4</td>
<td>114 x 70 x 4</td>
</tr>
<tr>
<td></td>
<td>3750</td>
<td>1655</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4100</td>
<td>1715</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4350</td>
<td>1885</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4750</td>
<td>2250</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50C/E</td>
<td>van</td>
<td>4100</td>
<td>1825</td>
<td>174 x 70 x 4</td>
<td>114 x 70 x 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4100 long overhang</td>
<td>2220</td>
<td></td>
<td></td>
</tr>
<tr>
<td>minibus</td>
<td></td>
<td>4100 long overhang</td>
<td>2220</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Stresses on the chassis**

The following stress value in static conditions cannot be exceeded for any reason whatsoever:

**Note**  
Permitted static stress on the chassis: \( \sigma_{adm} = 120 \text{ N/mm}^2 \)

In any case, respect any more restrictive limits placed by national standards.

Welding causes material property deterioration; therefore, when checking stresses in thermally altered zones, a resistance reduction of 15% must be accounted for.

### 2.2 DRILLS ON THE CHASSIS

Installation of auxiliary equipment onto the chassis must be done using the factory drilled holes whenever possible.

- It is strictly forbidden to drill holes into the side member flaps, with exception to what is indicated in Chapter 3.3 - Paragraph "Choosing the type of connection".

When new holes must be made for specific applications (installation of shelves, corner shelves, etc.), these must be drilled into the upright rib of the side member and must be thoroughly de-burred and bored.
Hole position and size

The new holes must not be drilled into the areas subjected to greater stresses (such as spring supports) or where the side member section varies.

Hole diameter must be suited to sheet metal thickness but cannot exceed 13 mm (unless otherwise stated). The distance of the axis of the holes from the edge of the side member must not be less than 30 mm; in the same way, the axes of holes must not be less than 30 mm from each other or from other existing holes.

The holes must be offset as in Figure 2.

The original hole layout must be maintained when moving spring supports or crossbars.

Screws and nuts

We generally recommend the use of the same type and class of screws and nuts as those employed for similar anchorages on the original vehicle (see Table 2.3).

<table>
<thead>
<tr>
<th>Resistance class</th>
<th>Use</th>
<th>Breaking strength [N/mm²]</th>
<th>Yield stress [N/mm²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.8</td>
<td>Intermediate resistance screws (crossbars, shear resistant plates, brackets)</td>
<td>800</td>
<td>640</td>
</tr>
<tr>
<td>10.9</td>
<td>High resistance screws (springs supports, stabilizer bars and shock absorbers)</td>
<td>1000</td>
<td>900</td>
</tr>
</tbody>
</table>

The screws belonging to classes 8.8 and 10.9 must be well cleaned and, for applications with diameter ≤ 6 mm, protection FeZnNi 7 IV S is recommended; for diameters > 6 mm, protection GEO-8 is recommended.

Screw treatment allowed is Geomet or zinc coating. Geomet treated screws are discouraged when using them in welding operations.

Use flange headed screws and nuts if there is sufficient space.

Use nuts with an anti-unscrewing system and keep in mind that the tightening torque must be applied to the nut.
Welds

When welding, drilling, milling and cutting near brake hoses and electrical wires, be sure to adopt appropriate precautions for their protection; disconnect these parts if necessary (respect the prescriptions in Chapters 2.15 and 5.4).

Welds are allowed:

- in side member unions for elongations or trimming;
- in the application of corner reinforcements in the area regarding side member modification, as hereafter specified (see Figure 3).

The following instructions must be respected when performing electric arc welding and in order to protect electrical components and ECUs:

- before disconnecting the power cables ensure there are no active electric users;
- if an electric circuit breaker (main switch) is present, wait for it to complete the cycle;
- disconnect the negative pole from the battery;
- disconnect the positive pole of the battery without connecting it to ground; do NOT short-circuit the negative pole;
- disconnect all ECU connectors, proceed with caution and do not touch the ECU connector pins;
- disconnect the ECU from the vehicle for welds close to the ECU;
- connect the welder ground directly to the weld piece;
- protect the plastic pipes from heat and disconnect them if necessary;
- protect the surfaces of the leaf and air springs against any weld splashes when welds are performed nearby;
- avoid touching the spring leafs with the electrodes or pliers.
Weld operations

- Cut the side members with a skewed or vertical cut. Cuts are not permitted in areas where there are a high concentration of stresses (e.g. spring brackets). The cutting line must not go through the holes on the side member (see Figure 4).

![Figure 4](image)

- Make a 60 degree bevel cut on the internal part of the side member of the parts to be joined, along the entire length of the weld area (see Figure 5).

![Figure 5](image)

- Arc weld the area with multiple steps and use base electrodes that are thoroughly dried. Avoid power overloads; the welds must be free of marginal incisions and slag.

- Let the side members cool slowly and in a uniform fashion. No cooling with air jets, water or other means is allowed.

- Grind off the excess material.

- Mount steel corner reinforcements that have the same characteristics as the chassis; the minimum indicative sizes are shown in Figure 3. Reinforcement anchorage must regard only the vertical rib of the side member and can be realised with a weld bead, staples, bolts or nails (even Huck nails).

Area and length of the weld bead, number and distribution of staples, number of nails of bolts must be adequate to transmit the bending and shearing moments.

- Once work is complete, use anti-rust protection (see Paragraph "Added or Modified Parts" (☞ Page 13)).
Sealing holes by welding

If new holes are located near old holes, (see Figure 2), these last can be welded shut.

Good results are obtained by:

- chamfering the outer edge of the hole;
- applying a copper plate on the inner edge of the side member to hold the welding material;
- welding the side member on both sides with elimination of all residual material.

Holes of 20 mm diameter can be sealed off by using chamfered washers welded on both sides.

### 2.3 RUST AND PAINT PROTECTION

**Note**  All components mounted on the chassis must be painted in compliance with IVECO Standard 18-1600 Colour IC444 RAL 7021 - 70/80 gloss.

#### Original vehicle parts

The following tables show, respectively, the classes of coating and protection required for the original vehicle components, the protections required for the parts not painted or in aluminium and treatments required for the painted parts.

**Table 2.4 - Class of protection - IVECO Standard 18 - 1600 (Prospectus I)**

<table>
<thead>
<tr>
<th>Class</th>
<th>Part requirements</th>
<th>Examples of parts involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Parts in direct contact with atmospheric agents</td>
<td>Bodywork - Rear-view mirrors - Windscreen wipers - Metallic structured sun visors - Metallic bumpers - Cab hook lock - Door stop device - Bodywork fastening elements (screws, bolts, nuts, washers), etc.</td>
</tr>
<tr>
<td>B</td>
<td>Parts in direct contact with atmospheric agents that mainly have structural characteristics, in clear sight</td>
<td>Chassis and relative parts, including its fasteners Parts below the front grille (class B) External cab footboards</td>
</tr>
<tr>
<td>B1</td>
<td>Only for rear axles and front axles</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Parts in direct contact with atmospheric agents, not in clear view</td>
<td>Engine and relative parts</td>
</tr>
<tr>
<td>D</td>
<td>Parts not in direct contact with atmospheric agents</td>
<td>Pedals - Seat coverings - Fastening elements - etc., mounted inside the cab</td>
</tr>
</tbody>
</table>

**Table 2.5 - Unpainted aluminium parts - IVECO Standard 18 - 1600 (Table IV)**

<table>
<thead>
<tr>
<th>Type of protection</th>
<th>IVECO standard</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel (1)</td>
<td>18-0506</td>
<td>A</td>
</tr>
<tr>
<td>Geomet (2)</td>
<td>18-1101</td>
<td>yes</td>
</tr>
<tr>
<td>GEO 321-8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEO 500-8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEO 321-8 PM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GEO 321-8 PML</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## 2.3 RUST AND PAINT PROTECTION

### Table 2.6 - Painted parts - IVECO Standard 18 - 1600 (Prospectus III)

<table>
<thead>
<tr>
<th>Cycle phase description</th>
<th>Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>MECHANICAL SURFACE CLEANING ‡</td>
<td>Sand/shot blasting</td>
</tr>
<tr>
<td></td>
<td>Brushing</td>
</tr>
<tr>
<td></td>
<td>Sandpapering</td>
</tr>
<tr>
<td>PRE-TREATMENT</td>
<td>Iron phosphating (only for non-precoated ferrous materials)</td>
</tr>
<tr>
<td></td>
<td>Zinc phosphating (**)</td>
</tr>
<tr>
<td>CATAPHORETIC PAINTING</td>
<td>High thickness (30-40 μm)</td>
</tr>
<tr>
<td></td>
<td>Medium thickness (20-30 μm)</td>
</tr>
<tr>
<td></td>
<td>Acrylic finishing (&gt;35 μm)</td>
</tr>
<tr>
<td>RUST PREVENTER</td>
<td>Bi-component (30-40 μm)</td>
</tr>
<tr>
<td></td>
<td>Single-component (30-40 μm)</td>
</tr>
<tr>
<td>ANTIROCK PRIMER</td>
<td>Single (130 °C) or bicomponent (30-40 μm)</td>
</tr>
<tr>
<td>VARNISH</td>
<td>Single (130 °C) or bicomponent (30-40 μm)</td>
</tr>
<tr>
<td></td>
<td>Powders (40-110 μm)</td>
</tr>
<tr>
<td></td>
<td>Low temperature single-component (30-40 μm)</td>
</tr>
</tbody>
</table>

---

1. Coupling with other materials must not cause the "battery effect".
2. Coatings free from chromium salts.
4. In alternative to single and bi-component paint only for particular bodywork (windscreen wipers, rear-view mirrors, etc.).
5. Only rear/front axes.

---

(‡) This operation must be performed when dealing with cutting burr, oxidation, weld slag, or laser-cut surfaces.
(†) Two-layer bodywork cycle.
(‡) Three-layer bodywork cycle.
(6) Excluding parts that cannot be immersed in pre-treatment baths or undergo painting because of compromised functionality (e.g.: mechanical parts).

(7) Only if the colour is defined in a drawing according to I.C.

(8) For fuel tanks in ferrous or pre-coated sheets.

(9) Only parts to mount on the engine.

(*) Alternative products and cycles for the same phase under the condition of comparability with the part to treat.

(**) Specific phosphates must be used for zinc coated or aluminium sheets.

**Added or modified parts**

All vehicle parts (body, chassis, equipment, etc.) that are add-ons or subjected to modifications must be protected against oxidation and corrosion.

Areas free of protection on ferrous materials are not accepted.

Tables 2.7 and 2.8 indicate the minimal treatment that modified or added components must receive when it is not possible to have protection that is similar to that of original components. Different treatment is allowed if it ensures similar oxidation and corrosion protection.

Do not used powder varnish directly after degreasing has been performed.

Lightweight alloy, copper and brass parts must be protected.

**Table 2.7 - Painted modified parts or add-ons**

<table>
<thead>
<tr>
<th>Cycle phase description</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical surface cleaning</td>
<td>A - B - D (1)</td>
</tr>
<tr>
<td>(including elimination of burrs/oxidation and cleaning of cut parts)</td>
<td>Brushing/sanding/papering/sand blasting</td>
</tr>
<tr>
<td>Pre-treatment</td>
<td>Degreasing</td>
</tr>
<tr>
<td>Rust preventer</td>
<td>Bi-component (30-40 μm) (2)</td>
</tr>
<tr>
<td>Varnish</td>
<td>Bi-component (30-40 μm) (3)</td>
</tr>
</tbody>
</table>

(1) Modifications on rear axles, from axles and engine (classes B1 and C) not allowed

(2) Preferably epoxy

(3) Preferably polyurethane

**Table 2.8 - Unpainted or aluminium modified parts or add-ons**

<table>
<thead>
<tr>
<th>Type of protection</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>A - B (1)</td>
</tr>
<tr>
<td>Geomet</td>
<td>yes</td>
</tr>
<tr>
<td>Zinc coating (1)</td>
<td>–</td>
</tr>
</tbody>
</table>

(1) Free from hexavalent chromium
Precautions

a) On the vehicle

Appropriate precautions must be taken to protect parts on which paint could be harmful to the conservation and operation thereof:

- hoses for pneumatic and hydraulic systems in rubber or plastic, with particular reference to the braking system;
- gaskets, rubber or plastic parts;
- air inlet for the batteries, stainless steel pipes and relative fans;
- propeller shaft flanges;
- suspension, hydraulic/pneumatic cylinder stems;
- air bleed valves (mechanical assemblies, air reservoirs, etc.);
- power steering pump and relative pipes;
- tanks;
- plates, codes.

If painting is required after wheels are removed, it is necessary to:

- Protect the wheel rim mounting surfaces on the hubs and the contact areas of the locking lugs/wheel studs;
- ensure adequate protection of brake discs.

The electronic components and modules must be removed.

b) On electric and electronic components

Appropriate precautions must be taken to protect:

- wiring and ground contacts;
- cables and corrugated tubing of the electrical system and in particular, those relating to high voltage systems (orange wiring);
- the sensor/actuator side connectors and wiring side;
- isolated electronic control units and those fitted or flanged directly to the components;

Note When the painting operation has been completed, and prior to oven drying (max. temperature: 80 °C), all parts which may be damaged by exposure to heat, must be removed or protected.

2.4 WHEELBASE MODIFICATION

At the time of issue of these Directives, there is no option of modifying the original wheelbase of the vehicle.

2.5 REAR OVERHANG MODIFICATION

General information

When modifying the rear overhang, the limits set by national standards must be respected. This is also the case for the maximum distances from the rear structural edge and distance from the ground, defined for the tow hook and under-run protection. The distance from the tip of the frame to the rear edge of the superstructure must, as a rule, not exceed 350–400 mm.

If it is necessary to move the rear crossbar fixed using screws, it is necessary to maintain the same type of union as in the series (number of screws, dimensions, strength class).

If all works are performed in a professional manner and according to the instructions contained herein, the original towing capacity may remain the same.

In all cases, the parties performing the work shall be liable thereof.
Authorisation

Rear frame elongation as well as shortening to the smallest value for each model of the series do not require authorisation if performed in compliance with the instructions provided herein.

**Note**  *If there is a traction battery at the rear overhang, the modification must be authorised by IVECO.*

Chassis Shortening

The last crossbar must be moved forward when shortening the rear overhang of the frame.

When the rear crossbar is too close to another crossbar, the latter can be eliminated if it plays no role in suspension support.

Elongation

Possible solutions, in relation to the length of the extension, are shown in Figures 8, 9 and 10.

Cuts can be of straight type. The minimum dimensions of the reinforcements to apply in the area of modification are shown in Figure 2.3.

The solution for elongations no greater than 300–350 mm is shown in Figures 8 and 9; In this case, the corner reinforcements, which also serve as junction between cross member and frame, must have the same width and thickness of the original gusset plate.

The union between the cross member and plate, originally performed using nails, can be done with screws class 8.8 having the next largest scale diameter and anti-unscrewing nuts.

The solution for elongations greater than 350 mm is shown in Figure 10.
When the elongation is rather large, the need of an additional crossbar must be evaluated on a case to case basis in order to ensure proper torsional strength of the frame. The insertion of an extra crossbar having characteristics similar to the series is necessary, however, when two cross members are spaced more than 1200 mm apart.

### 2.6 INSTALLING THE TOW HOOK

For New Daily Electric, there is no type-approved version for towing.

### 2.7 ASSEMBLING AN ADDITIONAL AXLE

The installation of additional axles is not envisaged.

### 2.8 GEARBOX MODIFICATION

Any intervention on the transmission must be authorised by IVECO and must be carried out on the basis of the technical indications provided in the manuals of the transmission manufacturer.

We recommend using original IVECO gearboxes; if this is not possible, the use of raw steel pipes with a yield load of at least 420 N/mm² (42 kg/mm²) may be used.

The universal joints may not be modified.

For every transformation of the transmission, of any of its parts, a thorough dynamic balancing must be performed on each section modified.

> Given that the transmission is an important part of the vehicle in terms on safety, we strongly recommend that all modifications made to it stand up to maximum safety standards. Therefore, all modifications should be made only by highly specialised Companies that are qualified by the transmission Manufacturer.
2.9 WORK ON SUSPENSIONS

Not permitted for New Daily Electric.

2.10 MODIFYING THE ENGINE AIR INTAKE AND EXHAUST SYSTEMS

Systems not present on the New Daily Electric.

2.11 MODIFYING THE ENGINE COOLING SYSTEM

The good operation of the original system must not be altered.

If any transformations are to be carried out which require modifications to the front of the driver's cab, the following must be taken into consideration:

- the area of the cross-section of the cooling air passage to the radiator must not be less than that realised on the standard cab (total area = 13.3 dm², of which 5.6 dm² for the area of the front grille and 7.7 dm² for the area obtained in the bumpers)
- the maximum extraction of hot air from the engine compartment must be guaranteed (with baffles and/or conveyors) ensuring that there is no stagnation or recirculation
- fan performance must not be modified;
- etc.

2.12 MODIFICATIONS TO THE AIR CONDITIONING SYSTEM

For New Daily Electric there are some configuration specifications of the air conditioning system, aimed at ensuring a certain level of comfort for the driver and/or passengers without overly compromising vehicle autonomy.

Any modifications to these systems and/or replacement of the coolant assemblies must be evaluated and authorised by IVECO.

2.13 BODYWORK INTERVENTIONS

General information

All interventions on the driver's cab must be authorised by IVECO in advance.

The modifications must not hinder operation of the control devices located in the area of the modification (e.g. pedals, switches, pipes, etc.) nor alter the strength of load-bearing elements (frames, reinforcement profiles, etc.). Care must be taken when dealing with operations that regard the engine cooling and air intake pipelines.

In relation to variation of cab weight, it is necessary to consider the position of the load in order to respect division of allowed axle loads 1.15 (Page 11).

As regards operations that entail the removal of internal sound barriers or protective panels (panelling, cladding) be sure to remove only the minimum amount possible; restore the protections as intended in the original design along with their original functionality.

Cab installation of controls and equipment (PTO engage switch, external operator cylinder control, etc.) is allowed as long as:

- installation is rational, performed in good detail and easy to access by the driver;
- the proper safety, control and signalling devices called for by national law are installed.

Make sure that the pipes and cables are installed correctly; adopt the necessary retainers and be sure to plan for appropriate distances from the engine, heat sources and moving parts.

Each structural modification must bear protection against corrosion (see Chapter 2.3 (Page 11)).

The use of zinc coated sheet metal is recommended on both ends of newly inserted sheet metal on cut bodywork in order to avoid ferrous corrosion of the welds (I.S. 18-1317 class ZNT/F/10/25 or I.S. 18-1318 class ZNT/10/25), both surfaces must undergo protective treatment.

Install gaskets with care and apply sealant to areas in need of protection.
Make sure that the seals are water, dust and smoke tight. The bodybuilder must check that the chassis, after its structural modifications, complies with the standards in force for what concerns both internal and external structure.

Interventions on chassis cab vehicles

a) Cab

Any cab modifications performed to create specific configurations must be done with care in order to protect the resistance and maintain cab functionality and protections intact.

In the installation of units on the roof (e.g. air-conditioning systems), make sure that the weight of the equipment does not exceed that permitted by the cab. The applicable limits can be provided on request, depending on the version.

If an opening has to be made, the following is required:

- envisage coupling radii of no less than 50 mm;
- do not modify any ribbing that may be present;
- do not modify the curvature of the roof.

b) Installation of spoiler or box on the roof

On request, versions are available developed for IVECO on the basis of its design and verifications.

If "kits" of other origins are fitted, follow the specific indications supplied by the manufacturer.

In any case, please note that the possible lack of contact between the superstructure and roof may trigger air turbulence resulting in fastidious vibrations or resonances; therefore the application of gaskets or sealing systems that protect the aerodynamics is strongly recommended.

If the national standards require it, these installations must be controlled by relevant type-approval authorities.

c) Roof and cab rear wall

If the rear wall and part of the roof have to be removed (e.g. auto-caravan set-ups), bear in mind the following indications:

- make the cut as shown in Figure 11, making sure to comply with the minimum coupling radii indicated;
- eliminate the rear cross member structure at roof level;
- implement a structure capable of ensuring that uprights cannot be deformed in order to retain the efficiency of the upper couplings of the safety belts;
- this structure should have a compression strength of at least 800 daN;
- implement the connection with the new structure following the general indications provided above.
1. Roof panel
2. Cutting limit area
3. Side finishing of roof
4. Door support ring

5. Internal rear cross member
6. Rear wall
7. Door area rear finishing
8. Side finishing

Figure 9
**d) Realization of sleeper cabs**

In the realization of sleeper cabs (e.g. 8+1), for special vehicles, municipal applications, fire brigade etc., the suspension must be adapted to the increased weight and to any extra places that are realized.

To perform work of this kind, confirmation must be obtained from IVECO of the suitability of the original suspension devices.

In outline, it may be possible to adopt solutions that are equivalent to those envisaged in routine production for similar versions.

Defining a suitable suspension system must:

- respect the cab structure provided in the standard vehicle;
- avoid that added weight causes serious damage to the original parts of the cab and relative suspension;
- ensure the normal oscillations along the vertical, longitudinal and transverse plane.

To help maintain the integrity of the cab, it is recommended to keep the rear structure as much as possible unchanged. The cut must be made laterally without damaging the door ring.

The bodybuilder must make the necessary connections to the load-bearing structure, comprising the longitudinal profiles and the uprights, connecting the new floor to them; inspection panels must also be provided, if necessary.

It is advisable to pay special attention to the surface preparation of parts to be welded (using a zinc primer) and to adopt the necessary precautions to ensure good preparation of the base for subsequent painting (see Chapter 2.3 (➡ Page 11)).

When modifying the cab, components such as the air intake and the filter may be involved. The use of original elements already provided for similar fittings, can be a good solution and allow the compliance with legislative regulations.

⚠️ **Note**  For work on the bodywork of vehicles equipped with front suspension with torsion bar, it is vital to ensure access to the trim adjustment system.

---

**Figure 10**

A. Area free of obstructions for access to the adjustment system
Interventions on van vehicles

a) Baggage compartment installation

The installation must be carried out using the fixing devices specifically envisaged on the roof (low roof and medium roof versions), bearing in mind the following indications:

- the fixing element must include the baggage rack anchoring device and ensure the necessary resistance to longitudinal and crossways forces.
- to avoid altering the vehicle's cornering stability, the load must not exceed a total of 150 kg;
- the mass allowed on each fixing element must not exceed 25 kg.

Table 2.15

<table>
<thead>
<tr>
<th>Dimensions [mm]</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Van wheelbase 3000 low roof - short overhang</td>
<td>1760</td>
<td>754</td>
<td>932</td>
<td>1548</td>
<td>1548</td>
<td>1548</td>
</tr>
<tr>
<td>Van wheelbase 3520 SL medium roof (H2)</td>
<td>2549</td>
<td>1082</td>
<td>935</td>
<td>1229</td>
<td>1229</td>
<td>1229</td>
</tr>
<tr>
<td>Van wheelbase 4100 SC medium roof (H2)</td>
<td>3713</td>
<td>1082</td>
<td>935</td>
<td>1229</td>
<td>1229</td>
<td>1229</td>
</tr>
</tbody>
</table>
b) Fitting a transparent roof
At the time of publication of these Directives, it is still not possible to collect information and components for this kind of conversion.

c) Fitting a hatch
It is possible to fit a hatch on the roof provided that this task does not affect the ribbing and that the seal and strength of the modified parts are not affected.

Figure 14 shows an installation example.

![Figure 12](image)

1. Cutting area
2. Anchorage profile
3. Sealant

d) Modifying the height of the roof
Three roof versions are available in production having respective inside heights of:

- low roof = 1595 mm
- medium roof = 1900 mm
- high roof = 2100 mm

Modifying the height of the roof is a very demanding and difficult task: this task should therefore only be performed on medium and high roofs, since they have the same roof structure.

Figure 15 shows the cross-section of the two versions, highlighting that the roof is a standardised structure.

To allow correct connection with the original roof, the bodybuilder must envisage appropriate intervention on the side ribbing.
e) Opening side windows

Opening side windows in van vehicles requires the specific precautions and expedients indicated below.

- Cut the sheet metal, taking care to maintain a profile with a minimum width of:
  - 15 mm (for fixed window with gasket seal);
  - 20–25 mm (for a bonded window).
- Create an internal supporting structure (see Figure 16) to ensure the necessary resistance and make the connection as indicated in the Figure.
- Remove the upright in the area affected by the new window and implement appropriate reinforcement at the base point.
f) Internal shelving
Installing inside shelves must be carried out with great care to ensure suitable stiffness and self-support. The lower support must involve the floor support structure (cross members and longitudinal profiles) and must be implemented in a manner that ensures uniform load distribution.

Anchoring of the side structure must avoid creating pre-load effects and may involve:

- the box uprights, where holes are already present;
- the upper connecting small beams.

---

g) Box section and flooring sections
Over and above the indications and precautions already mentioned, also bear in mind that:

- when drilling holes in the box sections, avoid areas where stresses are more concentrated (especially uprights A and B);
- The holes used for anchorage to the floor must be protected and sealed against infiltration of water, dust and exhaust gas;
- any lowering of the rear wheel arches must bear in mind possible juddering of the suspension and the possibility that snow chains may also be present. In this regard, Figure 17 highlights the cases that may occur and Table 2.16 provides the maximum shaking values allowed.
2.13 BODYWORK INTERVENTIONS

A. Van 35S
B. Minibus/Van 35C/Van 50C

1. Van wheel arch profile
   a. Maximum wheel shake

---

Table 2.16

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Tyres</th>
<th>Trucks</th>
<th>Vans</th>
</tr>
</thead>
<tbody>
<tr>
<td>35S</td>
<td>225 / 65 R16</td>
<td>230</td>
<td>195</td>
</tr>
<tr>
<td></td>
<td>235 / 65 R16</td>
<td>245</td>
<td>210</td>
</tr>
<tr>
<td>35C - 50C</td>
<td>195 / 75 R16</td>
<td>200</td>
<td>165</td>
</tr>
</tbody>
</table>

Protection of occupants

Airbags, safety belt fittings, the positioning of reels and pre-tension devices and anchorage of seats are all an integral part of passive safety.

- Any modification of these components may compromise the protection of persons on-board and compliance with legal requirements.

a) Airbag/Window bag

Work or component installations must not be carried out in areas that may inhibit the correct operation of the airbags. Consequently, the following must be avoided:

- modifications to the front structure of the vehicle, floor, firewall, sides and dashboard fixture points;
- alterations in the airbag control unit installation area (located under the floor between the front seats) and points involved in the system of sensors and related wiring harness;
- installation of components near the dashboard aperture;
- modifications to the steering column;
- replacements or installations of seats a different "H" point compared to the original versions.

Note Since the configuration of the electronic safety devices of the vehicles must not be modified, the Airbag system cannot be installed as "retrofit" and vice versa, must not be eliminated.

- The additional circuits must be separated from the main circuit of the vehicle and protected by means of a specific fuse.
b) Seat belt anchoring
Work in the body areas where there are seat belt fittings may affect the function/operation of these devices. It is therefore the responsibility of the bodybuilder to comply with regulations concerning:

- mounting and tightening torques
- choice of seat belts other than original versions;
- uniform operation between original seat belts and seats that may have a different configuration to the originals.

c) Seats
Moving the seats or fitting additional seats (for example, in a van of Cat. N1) is not permitted on vehicles already equipped with additional coupling points and which are the subject of alternative type-approval.

Any other solution is implemented under total responsibility of the bodybuilder as regards installation and final test procedures (destructive).

2.14 CHANGING TYRE SIZE

Note
Replacing the tyres with others of a different size or load bearing capacity compared to the specifications recorded during vehicle type approval requires IVECO certification and verification of whether the electronic management of the braking system requires reprogramming.

The vehicle must then be presented to the competent Body that will inspect the new tyres and the vehicle documents.

Mounting larger tyres:

- always requires a size check in relation to mechanical components, wheel arches, etc., in the various dynamic, steering and vehicle shaking conditions;
- may entail rim replacement with the consequential need to verify the spare wheel holder modification;
- may affect distance from ground of the rear under-run protection device and, in this case, a check on standard compliance is required; if necessary the support brackets must be replaced with appropriate and approved counterparts (see chapter 2.20 (➡ Page 34));
- requires the need to check compliance of the limit transversal contour allowed in relation to the various standards.

Prescriptions

Note
Replacing tyres with others of different outer diameter affects vehicle performance (e.g.: speed, max. vehicle ramp slope, tow load, braking force, etc.); therefore the Body Computer (speedometer, tachograph and speed limiter) must be subject to recalibration at an authorised IVECO workshop.

⚠️ Tyres of different size and type of structure cannot be mounted on the same axle.

The tyre load bearing capacity and the relative reference speed must be suitable to the vehicle's performance.

Mounting tyres with lower load bearing capacity or reference speed entails a reduction of allowed loads; on the other hand, mounting tyres with greater load bearing capacity does not automatically entail an increase of load allowed on the axles.

The dimensions and load bearing capacity of the tyres are established by international and national standards (ETRTO, DIN, CUNA, etc.) and are listed in the manuals of their respective Manufacturers.
Particular performance values may be envisaged by national standards for special uses, fire prevention, winter services, airport tank trucks, buses, etc.

- If vehicle configuration requires the wheels to be removed, make sure that the contact surfaces between rim and connection flange are clean and free of corrosion when remounting the wheels. In addition, tighten the wheel studs at the tightening torque according to the IVECO standard (see the following Table).

### Table 2.17 - Wheel tightening torque according to IVECO STD 17-9219

<table>
<thead>
<tr>
<th>N.</th>
<th>Connecting Elements</th>
<th>Thread</th>
<th>Class</th>
<th>Torque [Nm]</th>
<th>Features &quot;S&quot; (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Front and rear wheel mounting (33S-35S)</td>
<td>Stud bolt M14</td>
<td>II</td>
<td>144 176</td>
<td>&quot;S&quot;</td>
</tr>
<tr>
<td>2</td>
<td>OPT Alloy wheels (33S-35S)</td>
<td>Stud bolt M14</td>
<td>II</td>
<td>200 245</td>
<td>&quot;S&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Front and rear wheel mounting (35C-50C)</td>
<td>Nut M18x1.5</td>
<td>II</td>
<td>290 350</td>
<td>&quot;S&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Front and rear wheel mounting (60C-65C-70C)</td>
<td>Nut M18x1.5</td>
<td>II</td>
<td>290 350</td>
<td>&quot;S&quot;</td>
</tr>
</tbody>
</table>

(* Characteristic "S": safety tightening (see IVECO std. 19-0405).

- If using brackets to mount aesthetic studs positioned between the rim / lug or stud, or if using rims thicker than the original, geometric mounting functionality must be ensured through appropriate lengths of stud threading in the locking hole.

### 2.15 WORK ON THE BRAKING SYSTEM

#### General information

The braking system, together with its components, is of fundamental importance in terms of safety.

- Any modification to the braking system requires authorisation from IVECO, it being understood that no changes may be made to the following parts: brake cylinders and callipers, adjustment units and valves, parking brake, brake control and auxiliary systems.

If the national standards provide it, the vehicle must be presented to the competent authority for inspection.

#### Brake pipes

- It is absolutely forbidden to weld the pipes.

**Note** In the case of changes to the cantilever, the brake lines involved should preferably be replaced with new pipes and in one piece. If it is not possible to use one-piece pipes, the couplings to be used must be of the same type as the original ones in the rest of the system.

In the event of replacements the minimum internal dimensions, material and curvature radii of the pre-existing pipes must be respected.
NEW DAILY ELECTRIC – GUIDELINES FOR BODYBUILDERS
CHASSIS INTERVENTIONS

2.15 WORK ON THE BRAKING SYSTEM

For procurement please contact IVECO Assistance Service, whereas for assembly the directions in IVECO STD 17-2403 must be complied with.

▶ The total or partial painting of the brake pipes must be absolutely avoided and, for this purpose, appropriate masking of the pipes must be provided.

Metal pipes

Additions and replacements must envisage:

● for materials, dimensions, couplings: Standard ISO 4038
● radii of curvature (referring to the centre line of the pipe \( \phi = 4.76 \) mm): min 25 mm
● tightening torque:
  ■ stiff pipes, couplings M10x1 and M12x1: 14–18 Nm
  ■ hoses, male couplings M10x1: 17–20 Nm

Plastic pipes

Used on vehicles with air-operated suspension to connect air springs to the built-in control unit and to operate the braking corrector.

When making a replacement, bear in mind that plastic materials are not permitted:

● in areas were the temperature may exceed 80 °C, (e.g. within 100 mm of the engine exhaust system);
● between the chassis and moving parts, where special flexible pipes (hoses) should be used.

Operations must provide:

● materials and dimensions: Standards DIN 73378 and 74324 (Maximum operating pressure 11 bar)
● radii of curvature (referring to the centre line of the pipe): min 6 mm- outer \( \phi \)

Preparation and assembly (IVECO STD 17-2403)

Cut the pipe at right angles (15° maximum error), using a special tool in order to avoid imperfections that affect the sealing.

Permanently mark the section of pipe (dimension L in Figure 18) to be inserted into the coupling to ensure secure sealing.

Mark the pipe to avoid assembly errors in case of subsequent repair operations.

As much as possible, use the same couplings as the original ones, or otherwise belonging to the normal production of specialised manufacturers in the sector.
As much as possible, use quick-fit couplings.

For each intervention on the piping, verify whether there is the need, depending on the supplier, to use always new couplings or if it is possible to reuse those originally present through the use of appropriate tools (pliers).

When the space conditions require it (e.g. in proximity of curves), couplings with metal inserts can be used.

Before inserting the pipe into the coupling, screw the coupling into the threaded insert of the same component (e.g. pneumatic valve), using the following values for tightening:

**Table 2.18**

<table>
<thead>
<tr>
<th>Thread</th>
<th>Tightening torque [Nm ± 10%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 8 x 1 mm</td>
<td>20</td>
</tr>
<tr>
<td>M 12 x 1.5 mm</td>
<td>24</td>
</tr>
<tr>
<td>M 14 x 1.5 mm</td>
<td>28</td>
</tr>
</tbody>
</table>

Insert the pipe into the coupling for the previously marked stretch of length L, using a force of between 30 and 120 N, depending on the size of the tube.

The replacement of components (valves, etc.) is made possible because the engagement and coupling allow an internal rotation during the operation of unscrewing and screwing.

**Vehicle pipe installation**

Before use, the new pipes must be thoroughly cleaned inside, for example by blowing air with a compressor.

The pipes must be fixed to the frame with elements which envelop the pipe completely and which may be metal with rubber/plastic protection or be made of plastic material.

Figure 19 shows two examples of brackets complete with retainer clamps used to secure pipelines along the chassis.
Provide appropriate distances between one fastening element and the other; generally, max. 500 mm for plastic pipes and max. 600 mm for metal pipes can be considered.

In order to avoid deformations and tensions at the time of closure of the couplings for the plastic pipes, it is necessary to take care of the line and the accommodation of the fastening elements, rubbing should be avoided with the fixed parts of the vehicle and meet the necessary safety distances from moving parts and heat sources.

In passing the pipes through the chassis (side members or crossbars), take precautions to avoid damage. One solution would be to use a coupling passing directly through or at an angle, or a rubber protective eyelet, as shown in Figure 20.

⚠️ After each intervention, thoroughly bleed the air, using only the specific equipment used in the IVECO Authorized Workshops.

Note  The fluid discharged from the hydraulic circuit must not be used again. Top up using only new fluid of the prescribed type, contained in original, sealed containers that should only be opened when using the fluid.
**EVSC (Electronic Vehicle Stability Control)**

The EVSC is an electronic function which contributes to the active safety of the vehicle and therefore is compulsory under European Regulations.

This function ensures control of crossways dynamics and stability by means of the components indicated in Figure 21. In particular, in the event of potential vehicle instability and through the electro-hydraulic modulator, the control unit activates modulated braking of one or more wheels simultaneously.

To ensure correct programming of the EVSC control unit (or Body Computer), the following parameters are important:

- vehicle configuration (van, truck, camper,...);
- wheelbase;
- GVW;
- type of suspension;
- type of gearbox/transmission
- wheel circumference;

Any variation of one or more of these parameters requires re-programming of the EVSC control unit (or Body Computer) or the functional derating of the system.

The following paragraph describes the main situations that may arise.

**Note** Reprogramming the control unit or derating of the EVSC system must only be performed by the IVECO Assistance Service.
EVSC system derating

- Derating of the EVSC system is only possible for certain vehicle categories: for their identification and relative dispositions, refer to Attachment XI of Directive 2007/46/EC - latest version amended. Derating of the EVSC system involves the complete deactivation of vehicle stability control.

If derating is implemented, functions nonetheless remain active:

- ABS (Antilock Braking System) to avoid wheel locking
- EBD (Electronic Brake Force Distribution) to distribute the braking force between front and rear axles
- ASR (Anti Slip Regulator) to reduce drive wheel slipping on breakaway
- MSR (Motor Schleppmomenten Regelung) to control the braking effect of the engine when released
- LAC (Load Adaptive Control) to adapt the extent of braking to the distribution of the load on the vehicle
- HHC (Hill Holder Control) to facilitate breakaway from a standstill in ascent

Variation of GVW

Variations of vehicle GVW must be authorised since it involves verifying the availability of an appropriate EVSC system management software; degrading is only possible in the cases indicated in Attachment XI of Directive 2007/46/EC.

Wheelbase variation

Not provided.

Modification or replacement of suspensions

Not applicable.

Changing tyres

See Chapter 2.14 ( ➤ Page 26)

- It is forbidden to modify the characteristics of the tyres outside the range type-approved by IVECO.

2.16 ELECTRICAL SYSTEM: CURRENT INTERVENTIONS AND DRAWS

For information on work on the electrical system, refer to what is described in Section 5 - Chapter 5.4.

2.17 PART RELOCATION AND ANCHORAGE OF ADDITIONAL UNITS AND EQUIPMENT

Moving assemblies and various components for the installation of equipment is only permitted provided that:

- the functionality of the unit is not compromised;
- the original type of connection is restored;
- the new placement and distribution of mass is compatible with that originally established.

Note Moving the traction batteries and/or the SuperCapacitor on the New Daily Electric must be authorised by IVECO.
The displacement of the horn obligates the bodybuilder for a new approval. Also in the new position, the device must ensure the acoustic performance set by the regulations and must be adequately protected from exposure of weathering and/or soiling. IVECO reserves the right to void the warranty on the moved component.

**Wheel holder**

For chassis cabs not supplied with a spare wheel holder, or in cases where it is necessary to move the spare wheel, a special support must be made that allows rapid extraction and meets a minimum entry angle of 7°.

Figures 22 and 23 show two possible solutions.

To secure the spare wheel to the side of the vehicle with a support applied to the rib of the side member, we recommend the application of a local reinforcement plate arranged inside or outside the side member itself and sized depending on both the mass of the wheel and the presence or absence of other reinforcements on the side member.

To minimise torsional stress on the chassis of the vehicle it is advisable to perform the installation in correspondence with a crossbar, especially in the case of high mass units.

Similarly, it must act for the installation of tanks, compressors, etc.; the distribution of weight must also be taken into account for their positioning (see Chapter 1.15 (➔ Page 11)). In all these applications, one should always provide a sufficient margin in their height from the ground in relation to the use of the vehicle.

The holes to be drilled for the new arrangements should be made on the rib of the side member, according to the regulations given in Chapter 2.2 (➔ Page 7) and taking care to use the existing holes as much as possible.
2.18 TRANSPORT OF HAZARDOUS MATERIALS (ADR)
Not foreseen for New Daily Electric.

2.19 INSTALLING A RETARDER
Not permitted given the intrinsic characteristics of the electric motor

2.20 REAR UNDER-RUN PROTECTION (RUP)
The maximum distance between the rear under-run protection device (RUP = Rear Under-run Protection) and the rear-most point of the superstructure is 400 mm, less the deformation observed in the approval phase (on average 10 mm).
If the changes on the chassis require the adaptation of the rear overhang, the under-run protection must be placed by performing the same connection to the chassis as provided in the original version.
In the transformation of the vehicle or in the application of special equipment (e.g. rear tail lifts), it may be necessary to modify the structure of the under-run. The intervention shall not change the resistance characteristics and the original rigidity.
The compliance of the modified device with standards in force must be demonstrated to the competent authorities by appropriate documentation or test certificates.
2.21 REAR MUDGUARDS AND WHEEL ARCHES

On chassis cab version vehicles without rear mudguards, the bodybuilder must implement solutions equal to those provided by IVECO.

For the construction of the mudguards, the wheel arch compartments and the shaping of the superstructure, keep in mind that:

- the free shaking of the wheels must be ensured even in the conditions of use with chains; any indications on limit values can be requested via the Support Service;
- the width of the mudguard must be greater than the maximum dimensions occupied by the tyres, within the limits set by the regulations;
- the support structure of the mudguard must have adequate strength and be able to limit the vibrations;
- the connection may be made on the vertical rib of the side members of the vehicle (only using the existing holes) or directly below the applied superstructure.

The first and second point are also to be considered in the realisation of the wheel arch compartments. In this regard, Figure 24 highlights the cases that may occur and Table 2.16 provides the maximum lowering values allowed.

2.22 MUDFLAPS

Once outfitting is complete, the mudflaps must be included in the vehicle equipment if and as indicated by the regulations in force.
2.23 SIDE PROTECTIONS

In some countries, regulations (national or EC) require the application of side protections. Compliance with the required characteristics should be assured by the bodybuilder who handles completion of the vehicle, if it was not already equipped as such originally (optional setting).

In permanently applied superstructures (e.g. fixed bodies, vans) side protection can be applied on the basis of their structure (e.g. frame of the floor beams), while for mobile superstructures (e.g. tippers) the connection can be made by means of suitable supports on the subframe or directly on the frame. In the latter case, use the existing holes on the vertical rib of the side member as much as possible, in compliance with Chapter 2.2 ([Page 7]).

In implementing the outer protection, as required by the regulations (e.g. EC Directive), it is permitted to use either a single section with a surface extending in the vertical longitudinal sections, with pre-set dimensions and distances between them.

The protection must be connected to the support structures in order to be quickly removed or reversed in case of maintenance or repair of the units behind them.
SECTION 3

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APPLICATIONS OF SUPERSTRUCTURES

Note The following specific instructions complement the regulations contained in Section 1 "GENERAL INFORMATION".

3.1 CONSTRUCTION OF THE SUBFRAME

The purpose of the subframe is to ensure a uniform load distribution on the vehicle chassis and the necessary cooperation with it to the effects of resistance and stiffness, depending on the vehicle’s specific use.

Material

In general, if the stresses on the subframe are not high, the material for its realisation may have characteristics inferior to those of the chassis, notwithstanding the need to have good characteristics of weldability and limits that are not lower than the values (1) shown in Table 3.1.

In cases where the stress limits require it (e.g. for crane applications), or if you want to avoid high section height, materials with superior mechanical characteristics may be used. You should, however, keep in mind that the reduction of the time of inertia of the reinforcing section involves bending and higher stresses on the main chassis.

Following are the characteristics of certain materials which were taken into account in some of the applications stated below.

Table 3.1 - Material to be used for the construction of superstructures Std IVECO 15-2110 and 15-2812

<table>
<thead>
<tr>
<th>Name of steel</th>
<th>Breaking strength [N/mm²]</th>
<th>Yield stress [N/mm²]</th>
<th>Elongation</th>
</tr>
</thead>
<tbody>
<tr>
<td>IVECO Fe 360D</td>
<td>360 (1)</td>
<td>235 (1)</td>
<td>25% (1)</td>
</tr>
<tr>
<td>EUROPE S235J2G3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GERMANY ST37-3N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.K. 40D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IVECO Fe E420</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EUROPE S420MC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GERMANY Q56E420TM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.K. 50F45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IVECO Fe 510D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EUROPE S553J2G3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GERMANY ST52-3N</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.K. 50D</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sizing of profiles

The following table shows the values of section modulus Wₓ for C section profiles recommended by IVECO.

The indicated value Wₓ refers to the actual section and takes into account the radii of curvature of the section (can be calculated with good approximation by multiplying the value obtained by 0.95 considering the section composed of simple rectangles). Profiles of different section may be used in lieu of those specified, provided that section modulus Wₓ and inertia time Jₓ of the new C section are not of a lesser value.
### Table 3.2 - Profile dimensions

<table>
<thead>
<tr>
<th>Section modulus ( W_x ) ( [cm^3] )</th>
<th>Recommended C profile ([mm])</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 ( \leq W \leq 19 )</td>
<td>80 x 50 x 4</td>
</tr>
<tr>
<td></td>
<td>80 x 60 x 4</td>
</tr>
<tr>
<td></td>
<td>80 x 50 x 5</td>
</tr>
<tr>
<td>20 ( \leq W \leq 23 )</td>
<td>80 x 60 x 5</td>
</tr>
<tr>
<td>24 ( \leq W \leq 26 )</td>
<td>80 x 60 x 6</td>
</tr>
<tr>
<td>27 ( \leq W \leq 30 )</td>
<td>80 x 60 x 7</td>
</tr>
<tr>
<td></td>
<td>100 x 50 x 5</td>
</tr>
<tr>
<td>31 ( \leq W \leq 33 )</td>
<td>80 x 60 x 8</td>
</tr>
<tr>
<td></td>
<td>100 x 60 x 5</td>
</tr>
<tr>
<td>34 ( \leq W \leq 36 )</td>
<td>100 x 60 x 6</td>
</tr>
<tr>
<td>37 ( \leq W \leq 41 )</td>
<td>100 x 60 x 7</td>
</tr>
<tr>
<td>42 ( \leq W \leq 45 )</td>
<td>80 x 80 x 8</td>
</tr>
<tr>
<td></td>
<td>100 x 60 x 8</td>
</tr>
<tr>
<td>46 ( \leq W \leq 52 )</td>
<td>120 x 60 x 6</td>
</tr>
<tr>
<td></td>
<td>120 x 60 x 7</td>
</tr>
<tr>
<td>53 ( \leq W \leq 58 )</td>
<td>120 x 60 x 8</td>
</tr>
<tr>
<td>59 ( \leq W \leq 65 )</td>
<td>140 x 60 x 7</td>
</tr>
<tr>
<td></td>
<td>120 x 70 x 7</td>
</tr>
<tr>
<td>66 ( \leq W \leq 72 )</td>
<td>140 x 60 x 8</td>
</tr>
<tr>
<td></td>
<td>120 x 80 x 8</td>
</tr>
<tr>
<td>73 ( \leq W \leq 79 )</td>
<td>160 x 60 x 7</td>
</tr>
<tr>
<td>80 ( \leq W \leq 88 )</td>
<td>180 x 60 x 8</td>
</tr>
<tr>
<td>89 ( \leq W \leq 93 )</td>
<td>160 x 70 x 7</td>
</tr>
<tr>
<td></td>
<td>180 x 60 x 7</td>
</tr>
<tr>
<td></td>
<td>140 x 80 x 8</td>
</tr>
<tr>
<td>94 ( \leq W \leq 104 )</td>
<td>180 x 60 x 8</td>
</tr>
<tr>
<td>105 ( \leq W \leq 122 )</td>
<td>200 x 80 x 6</td>
</tr>
<tr>
<td></td>
<td>200 x 60 x 8</td>
</tr>
<tr>
<td></td>
<td>180 x 70 x 7</td>
</tr>
<tr>
<td>123 ( \leq W \leq 126 )</td>
<td>220 x 60 x 7</td>
</tr>
<tr>
<td>127 ( \leq W \leq 141 )</td>
<td>220 x 60 x 8</td>
</tr>
<tr>
<td>142 ( \leq W \leq 160 )</td>
<td>200 x 80 x 8</td>
</tr>
<tr>
<td></td>
<td>240 x 60 x 8</td>
</tr>
<tr>
<td>161 ( \leq W \leq 178 )</td>
<td>220 x 80 x 8</td>
</tr>
<tr>
<td></td>
<td>240 x 70 x 8</td>
</tr>
<tr>
<td>179 ( \leq W \leq 201 )</td>
<td>250 x 80 x 7</td>
</tr>
<tr>
<td></td>
<td>260 x 70 x 8</td>
</tr>
<tr>
<td>202 ( \leq W \leq 220 )</td>
<td>250 x 80 x 8</td>
</tr>
<tr>
<td></td>
<td>260 x 80 x 8</td>
</tr>
<tr>
<td>221 ( \leq W \leq 224 )</td>
<td>220 x 80 x 8</td>
</tr>
<tr>
<td></td>
<td>280 x 70 x 8</td>
</tr>
<tr>
<td>225 ( \leq W \leq 245 )</td>
<td>250 x 100 x 8</td>
</tr>
<tr>
<td></td>
<td>280 x 80 x 8</td>
</tr>
<tr>
<td>246 ( \leq W \leq 286 )</td>
<td>280 x 100 x 8</td>
</tr>
<tr>
<td>290 ( \leq W \leq 316 )</td>
<td>300 x 80 x 8</td>
</tr>
<tr>
<td>316 ( \leq W \leq 380 )</td>
<td>340 x 100 x 8</td>
</tr>
<tr>
<td>440</td>
<td>380 x 100 x 8</td>
</tr>
<tr>
<td>480</td>
<td>400 x 100 x 8</td>
</tr>
</tbody>
</table>

While the section modulus represents a decisive value for the stress of the material, the moment of inertia is important mainly for the flexural hardness and for the quota of the bending moment to be taken, depending on the connection used.
**Subframe dimension**

In case of elastic connection between chassis and subframe the bending moment $M_f$ must be subdivided proportionately between chassis and subframe at the moments of inertia of the sections:

\[
\frac{M_c}{M_t} = \frac{l_t}{l_t + l_c}
\]

\[
M_c = \frac{M_f}{l_t + l_c}
\]

\[
M_t = \frac{M_f}{l_t + l_c}
\]

\[
\sigma_c = \frac{M_c}{W_c} \leq \sigma_{amm}
\]

\[
\sigma_t = \frac{M_t}{W_t} \leq \sigma_{amm}
\]

$M_f$ = static bending moment generated by the superstructure [Nmm]

$M_c$ = proportional share of the static bending moment $M_f$ applied to the subframe [Nmm]

$M_t$ = proportional share of the static bending moment $M_f$ applied to the chassis [Nmm]

$I_c$ = moment of inertia of the section of the subframe [mm$^4$]

$I_t$ = moment of inertia of the section of the chassis [mm$^4$]

$\sigma_c$ = maximum static stress applied to the subframe [N/mm$^2$]

$\sigma_t$ = maximum static stress applied to the chassis [N/mm$^2$]

$W_c$ = section modulus of the section of the subframe [mm$^3$]

$W_t$ = section modulus of the section of the chassis [mm$^3$]

$\sigma_{amm}$ = maximum static stress allowed on chassis [N/mm$^2$] see chapter 2.1, Paragraph "Stresses on the chassis" (Page 7)

**Aluminium subframe**

When using materials with different characteristics from those of steel (e.g. aluminium), the size and structure of the subframe must be appropriately adjusted.

1. When the contribution of the subframe is mainly that of providing a uniform distribution of load and the chassis has the fundamental task of resistance, aluminium longitudinal profiles having dimensions similar to those indicated for the steel can be used. Typical examples are fixed bodies, vans and tanks, provided that the supports are continuous and close-up or in the immediate vicinity of the suspension mounts. An exception is made in cases where high stresses on the chassis require relatively large sections of the steel reinforcement, cut-resistant links.

2. When the subframe is prompted to make a contribution in terms of strength and hardness (e.g. superstructures with high concentrated loads, tipping bodies, cranes, centre axle trailers, etc.), the use of aluminium is generally not recommended and should be authorised from time to time by IVECO.

Please note that in defining the minimum size of the reinforcement profiles in addition to the limit of the allowable stress for aluminium, reference must be made to the different Elastic Modulus with respect to steel (approx. 7,000 kg/mm$^2$ against 21,000 kg/mm$^2$ for steel) which involves greater dimensioning of the profiles.
Similarly, when the connection between the chassis and subframe is such as to ensure the transmission of the shear stresses (connection with plates), in checking the stresses at the two ends of the individual section, it is necessary to define the new neutral axis for this, on the basis of the different elastic modulus of two materials.

The collaboration requirement for aluminium means, in short, large and not very convenient dimensions.

### 3.2 ELEMENTS MAKING UP THE SUBFRAME

#### Longitudinal profiles

The side members of the added structure must be continuous, extended as much as possible toward the front of the vehicle and towards the rear area of the front spring support; in addition, they must rest on the chassis and not on the brackets.

In order to achieve a gradual reduction of the resistant section, the front ends of the profile must be tapered in height with an angle not exceeding 30°, or another form of equivalent tapering (see Figure 2); the front end in contact with the chassis must be properly coupled, with min. radius of 5 mm.

![Figure 2](image)

In cases in which the components of the cab rear suspension (e.g. deep cabs) do not allow the passage of the profile in the entire section, this can be realised as in Figure 3. This may require verification of the minimum section of resistance in the presence of high front bending moments (e.g. with a crane behind the cab when operating towards the front of the vehicle) and requires fixing if possible at no more than 250 mm from the front end of the subframe.

![Figure 3](image)
The shape of the profile section is defined taking into account the function of the subframe and the type of overlying structure. Open C profiles are advisable when the subframe needs to adapt elastically to the vehicle chassis and boxed sections when you require greater stiffness of the assembly.

Care should be taken to achieve a gradual transition from the boxed section to the open section, as in the examples in Figure 4.

1. Normal boxed profiles
2. Gradual passage from the boxed section to the open section
3. 15 mm lintel (width of the wing of the profile)

It is necessary to create continuity of support between the profiles of the subframe and those of the chassis; if this is not obtained, the continuity can be restored by means of interposition of strips of sheet metal or light alloy.

If there is to be a rubber undercraw element we recommend characteristics and thicknesses similar to those used for normal production (hardness 80 Shore, max thickness 3 mm). Its use can prevent abrasive actions that can cause corrosion in the joining between materials of different composition (e.g. aluminium and steel).
The dimensions prescribed for the side members of the various types of superstructures are the recommended minimum values and, as a rule, are valid for vehicles with wheelbases and rear overhangs provided as standard (see Tables from 3.4 to 3.11). In all cases similar profiles can be used, but with moments of inertia and resistance that are not lower. These values can be obtained from the technical documentation of the profile manufacturers.

**Cross members**

A sufficient number of crossbars, possibly to be placed in correspondence with the fastening clamps to the chassis, must brace the two sections of the subframe.

The crossbars may be open section (e.g. C), or closed section where you would want to impart greater stiffness.

In their connection, suitable gusset plates as in the figure must be used to give adequate resistance to the connection (see the following Figure on the left). When you want to achieve greater stiffness in the connection, it can be carried out according to the following Figure on the right.

**Stiffening of the subframe**

For some superstructures (e.g. tipping bodies, concrete mixers, cranes on rear overhang, superstructures with high centre of gravity), the subframe should be stiff in the back.

This can be achieved by increasing the scope of stiffness to obtain:

- boxing the longitudinal sections in the rear area;
- adopting closed section crossbars (see Figure 6);
- applying cross diagonals (see Figure 7);

In general the use of boxed longitudinal sections should be avoided in the front part of the subframe.
Self-supporting superstructures with subframe functions

The interposition of a subframe (longitudinal and transverse) can be omitted in the case of installation of self-supporting superstructures (e.g. vans, tanks), or when the underlying structure of the equipment to be installed already has the subframe conformation.

3.3 CONNECTION BETWEEN CHASSIS AND SUBFRAME

Connection type

The choice of the type of connection to be used, if not provided by IVECO originally, is very important for the purposes of contribution of the subframe in terms of strength and stiffness.

It can be elastic (brackets or clamps) or rigid, resistant to shear stress (plates sealed longitudinally and transversally); the choice must be made according to the type of superstructure to be applied (see Chapters 3.4 to 3.14), by evaluating the stresses that the added equipment transmits to the chassis, both in static and dynamic conditions. Number, size and construction of the anchors, reasonably allocated in the length of the subframe, must be such as to ensure a good connection between the chassis and the subframe.

The screws and the clamps must have material strength class of not less than 8.8, and the nuts must be fitted with systems that prevent unscrewing. The first anchor should be positioned, if possible, at a distance of about 250–350 mm from the front end of the subframe.

The elements for the original connection already existing on the vehicle chassis must be preferred.

The respect of the distance indicated above for the first anchoring must be ensured especially in the presence of superstructures with concentrated loads behind the cab (e.g. crane, front body tilting cylinder, etc.), in order to improve the magnitude of the chassis stresses and contribute more to the stability. Provide additional connections if necessary.

If you have to install a superstructure with features different from those for which the chassis was designed (e.g. a tipping body on a chassis built for a fixed body) suitable connections must be provided (e.g. replacement of brackets with shear resistant plates in the rear area of the chassis).

⚠️ In anchoring the structure to the chassis, welding must not be performed on the vehicle chassis, nor may holes be drilled into its wings.

⚠️ During and after the connection operations of the subframe to the chassis, it is important to check the integrity of the High Voltage wiring (orange).
Connection characteristics

Elastic connections (see Figures 8, 9 and 10) allow limited movement between the chassis and the subframe; These connections make it possible to consider parallel cooperation of the two resistant sections, where each assumes a share of the bending moment proportional to its moment of inertia.

In the rigid connections (see Figure 11), a single resistant section can be considered for the two profiles, on the condition that the number and distribution of the connections are such as to withstand the consequent cutting forces.

The possibility of establishing a single resistant section between the chassis and the subframe allows you to achieve greater resistant capacity compared to the connections with brackets or clamps, obtaining the following benefits:

- lower height of the subframe profile to equal bending moment acting on the section;
- greater bending moment allowed, equal to the dimensions of the subframe profile,
- further increase in the resistance capacity if materials with high mechanical properties are adopted for the subframe.

Connection with brackets

Some examples of this type of connection are shown in Figures 8 and 9.

For the elasticity of the connection it is necessary that, before the closure of the clamping screws the distance between the brackets of the chassis and the subframe is 1–2 mm; greater distances should be reduced by means of suitable spacers. At the closure of the screws, brackets must be brought into contact.

The adoption of screws of a suitable length promotes the elasticity of the connection.

The brackets must be fixed to the rib of the side members of the vehicle by means of screws or nails.

In order to better contain the loads in the transverse direction, the brackets are normally applied so that there is a slight protrusion perpendicular to the upper edge of the chassis. If instead the brackets must be applied exactly to the wire, the side guide for the superstructure must be assured with other devices (e.g. using guide plates connected only to the subframe, or only to the vehicle chassis, see Figure 11). When the front connection is elastic (see Figure 9), the lateral containment must be assured even in conditions of maximum torsion of the chassis (e.g. off-road applications).

In the event in which the vehicle chassis is already equipped with brackets for the attachment of a body of a type established by IVECO, these brackets must be used for this purpose. For the brackets applied to the subframe or to the superstructure, resistance characteristics not less than those originally mounted on the vehicle should be provided (see Table 2.7 and Table 3.1).
Connections with greater elasticity

When the connection needs greater flexibility (e.g. vehicles with high stiffness of the superstructure such as vans, tanks, etc., used on winding roads or in poor conditions, vehicles for special use, etc.), hardware similar to the type indicated in Figure 9 should be adopted in the area behind the driver’s cab. Brackets accompanied by rubber plugs (1) or coil springs (2) should be used.

Bear closely in mind that:

● the elastic element characteristics should be suited to the stiffness of the superstructure, the wheelbase and the type vehicle use (irregular road conditions);
● stiffness must progressively increase for fixing points closer to the rear part of the chassis;
● the overall connection capacity must also include fixing points resistant to shear stress to be positioned near the rear suspension.

Consequently, the first fixing behind the cab must be made using one of the solutions shown in Figure 9; especially when the vehicle has a long wheelbase, this solution must also be replicated for the next fixing, modifying only the stiffness.

For example, in the case of brackets with rubber pads, elements must be used having the same hardness (sh = 83), assembled in dual pairs for the first bracket and single pairs for the next bracket, with M10 screws and tightening torques of 15-18 Nm.

Also bear in mind that:

● for rubber plugs, use materials that ensure good elasticity over time.
● every solution requires the preparation of appropriate instructions for interval controls and possible resetting of the tightening torques of parts.
● In versions where the vehicle is lifted by hydraulic stabilizers (e.g. cranes, aerial work platforms), limit the collapse of the elastic element to ensure sufficient cooperation of the subframe and avoid excessive bending moments on the original chassis.

Also bear in mind that:

1. in the case of superstructures that generate high bending and twisting moments (e.g. a crane behind the cab), the subframe must be properly sized to support them;
2. In versions where the vehicle is lifted by hydraulic stabilizers (e.g. cranes, overhead work platforms), limit the collapse of the elastic element to ensure sufficient cooperation of the subframe and avoid excessive bending moments on the original chassis.
Connections with clevis fasteners or clamps

Figure 10 shows the main constructions of this type.

In this case the bodybuilder must interpose a spacer (preferably metal) between the wings of the two side members and in correspondence to the clevis fasteners, in order to avoid the bending of the wings under the pull of the clevis fasteners.

In order to drive and better contain the transverse direction of the structure added to the chassis, this type of fixing can be completed with the addition of plates welded to the subframe as shown in Figure 11.

The characteristics of this connection advise against a general integral use on the vehicle; in any case, to give the added structure the suitable containment in the longitudinal direction as well as adequate stiffness, it is necessary to integrate the fastening to the rear part with longitudinal and transverse sealing plates.

For this purpose, it is also possible to use connections by means of screws at the rear end of the chassis as shown in Figure 12.

Connection with longitudinal and transverse sealing plates (rigid junction)

The type of mounting shown in Figure 11, made with plates that are welded or bolted to the subframe and fixed with nails or screws to the vehicle chassis, ensures a good capacity for reacting to longitudinal and transverse thrusts and the greatest contribution to the stiffness of the assembly.
For the correct use of these plates, please keep in mind that:

- the vertical rib of the chassis should be fastened only after making sure that the subframe is snug against the chassis itself;
- the distribution must be limited to the central and rear area of the chassis;
- the number and the thickness of the plates and the number of fixing screws must be adequate to withstand the bending moments and cutting of the section.

In cases where the superstructure generates high bending and twisting moments on the chassis and its resistant capacity should be increased by adopting a cut-resistant connection between the chassis and the subframe, or if you want to contain the height of the subframe as much as possible (e.g. centre axle trailers, crane on rear overhang, tail lifts, etc.), use the information supplied in the table below (valid for all models):

<table>
<thead>
<tr>
<th>Chassis and subframe height/section ratio</th>
<th>Max. distance between the centre lines of the cut-resistant plates [mm]</th>
<th>Models (3)</th>
<th>Minimum characteristics of the plates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Thickness [mm]</td>
<td>Dimensions of the screws (2) (min. 3 screws per plate)</td>
<td></td>
</tr>
<tr>
<td>&gt; 1.0</td>
<td>700</td>
<td>M 12 (min.2 screws per plate)</td>
<td></td>
</tr>
<tr>
<td>≤ 1.0</td>
<td>500</td>
<td>M 12 (3 screws per plate)</td>
<td></td>
</tr>
</tbody>
</table>

(1) The increase in the number of screws for each plate makes it possible to proportionally increase the distance between the plates (a double number of screws may allow a greater distance between the plates). In high stress areas (e.g. the rear spring supports, the tandem axle springs and the air springs), it is necessary to provide a distance between the plates, reduced as much as possible.

(2) In the presence of contained thicknesses of the plates of the chassis and the subframe, it is advisable to connect by adopting spacer bushes, in order to use longer screws.

(3) For models 35S, the application of plates resistant to shear stress must be evaluated on a case by case basis.
Mixed connection

Based on the indications in Chapter 3.1 (⇒ Page 5) for realisation of the subframe and the considerations of Chapter 3.3 (⇒ Page 11), the connection between the vehicle chassis and the reinforcing subframe may be of mixed type, i.e. obtained by rationally using the elastic connections (brackets, clevis fasteners) and rigid connections (longitudinal and transverse sealing plates).

Generally, it is preferable to have elastic connections in the front part of the subframe (one or two per side), while connections are recommended with plates toward the rear of the vehicle when it the added structure requires a greater contribution to the overall stiffness (e.g. tippers, cranes on rear overhang, etc.).

For this purpose, it is also possible to use connections by means of screws at the rear end of the chassis as shown in Figure 12.

![Figure 12](image)

1. Subframe
2. Chassis
3. Clevis fasteners
4. Hardware for longitudinal and transverse containment

3.4 CONTAINER APPLICATION

Dimensions and centres of gravity

Check the correct load distribution and in particular, respect the indications regarding the height of the centre of gravity as provided in Section 1 using suitable construction precautions and ensure that the transported load has maximum stability while running.

Flatbeds

The application on normal chassis cab vehicles, valid only for road services, is normally made through a support structure consisting of longitudinal and transverse profiles. The minimum Approximate sizes of the longitudinal sections are shown in Table 3.4.

<table>
<thead>
<tr>
<th>Models</th>
<th>Minimum reinforcing profile</th>
<th>Wheelbase [mm]</th>
<th>Section modulus Wx [cm²]</th>
</tr>
</thead>
<tbody>
<tr>
<td>35S</td>
<td></td>
<td>up to 3750</td>
<td>9</td>
</tr>
<tr>
<td>35C, 45C, 50C</td>
<td></td>
<td>4100</td>
<td>16</td>
</tr>
</tbody>
</table>

Note For the dimensions of the profiles see Table 3.2.

Fastening is achieved through specially crafted brackets along the vertical rib of the side members; if such connections have not already been specified by IVECO, they must be made according to the instructions in Chapter 3.3 - Paragraph "Connection with brackets" (⇒ Page 12). To achieve adequate longitudinal containment, in the case of connections with brackets or clamps, it is good practice to provide a rigid connection on the end of the rear overhang (one per side), obtained with screws or plates on the upper wing of the side member (see Figures 11 and 12).
In no other case should new holes be made on the wings of the main side members.

In cases in which the body uses elevated supports above the subframe (e.g. crossbars), it is necessary to suitably stiffen such supports, to contain the longitudinal thrusts, as shown in Figure 13.

The front wall of the bodywork must have the necessary strength and toughness to support the forces generated by the transported load, in the case of sudden and high decelerations.

**Implementing van versions**

A structure consisting of box section longitudinal and cross members may be used for connection to the chassis of the vehicle. For the longitudinal profiles, refer to the indications in Table 3.4.

Figure 14 shows an example installation where, in order to contain the height of the superstructure, the longitudinal profiles are integrated with cross members and brackets over the entire length.

In this case, the rear wheel arches may be inserted into the base of the structure.

When the floor makes use of cross beams which are no more than 700 mm apart and connected in such a way as to create a sufficiently rigid structure (self-supporting), it may not be necessary to use longitudinal profiles (see Figure 15).
To ensure the stability required for the cross members and avoid stiffening the front part of the vehicle chassis excessively, consider the indications given in the previous paragraph "Fixed bodies" (Page 16).

The mounting of dump bodies and structures having high torsional rigidity in general requires the use of flexible couplings towards the front part of the structure to avoid excessive reduction of the deformation characteristics of the main chassis.

Front wall

It must have the necessary strength and toughness to withstand the forces generated by the transported load, in the case of sudden and high decelerations.

Vans integrated with the cab

The coupling in these cases must be implemented so as to limit the stress transmitted to the vehicle cab. For couplings and fitting reinforcements, bear in mind that:

- no welding should be performed on the sheet metal of the cab and only mechanical fixture systems should be used;
- the self-supporting structure of the van must not require additional support provided by the cab;
- the parts of the cab affected by the conversion must be protected against oxidation and corrosion (see Chapter 2.2 (Page 7)).

Tipping bodies

The use of tipper bodies, rear and three sided, generally subjects the chassis to considerable stress. Therefore, please observe the following indications.

1. The subframe must be:
   - suitable for the type of vehicle and conditions of use,
   - with appropriately sized cross members and side members,
   - with the rear end stiffened with boxing and crossbraces (see Figure 6 and Figure 7). The connections to the chassis must be elastic (brackets or supports) at the front end, whereas the rear section requires stiff connections (cleat plates) (see Figure 11) to allow the additional structure to contribute more effectively towards the rigidity of the assembly. Omega shelves can be used on vehicles on where these are originally fitted.

2. The rear tipping hinge must be fitted on the subframe; its position must be as near as possible to the rear support of the rear suspension. In order not to affect the stability of the vehicle during tipping and to not excessively increase the stress on the chassis, it must be respected the distances indicated in Figure 16. If for technical reasons this cannot be achieved, small increases may be permitted provided a higher strength subframe is used, in order to increase the rigidity of the rear end.
Where long bodies are needed to transport large volumes, it is advisable to increase the wheelbase of the vehicle rather than create long overhangs.

3. Great care must be given to the positioning of the lifting device both in terms of providing support of adequate strength and in order to correctly position the mountings. In any case, it is advisable to place the ram to the front of the centre of gravity of the body and payload so as to reduce the extent of the localized load.

4. In rear tipping it is recommended that a stabilizer is fitted to guide the container, particularly when the lifting cylinder is located behind the cab.

5. The lifting device hinge must be mounted on the subframe. The useful volume in the body must conform with the maximum permissible load on the axles, to the density of the material to be transported (a density mass of approximately 1600 kg/m$^3$ is to be used for excavated material). In the case of transporting freight with a low density, the useful volume may be increased within the limits established for the maximum height of the centre of gravity of the payload (plus the fixtures).

6. The bodybuilder must ensure the functioning and safety of all parts of the vehicle (e.g. the positioning of lights, towing hook etc.) and ensure that, following the addition of the structure, vehicle stability is guaranteed during tipping operations.

**Note** To ensure stability on vehicles with air suspension it is required to deflate the air bellows completely.

![Figure 16](image)

**Table 3.5**

<table>
<thead>
<tr>
<th>Models</th>
<th>Minimum reinforcing profile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Section modulus $W_x$ [cm$^3$]</td>
</tr>
<tr>
<td>35C</td>
<td>19</td>
</tr>
<tr>
<td>45C, 50C</td>
<td>36</td>
</tr>
</tbody>
</table>

**Note** For the dimensions of the profiles see Table 3.2.
3.5 TRACTOR FOR SEMI-TRAILER

Transformation not permitted.

3.6 TRANSPORT OF INSEPARABLE MATERIALS (TRAILER TRUCKS)

Not permitted for this type of category.

3.7 TANKS AND CONTAINERS

Application not provided.

3.8 INSTALLING A CRANE

The selection of the crane must be made with due consideration to its characteristics and in relation to the performance of the vehicle.

The positioning of the crane and of the payload must be done within the load limits permitted for the vehicle. Installation of the crane must be carried out in compliance with statutory requirements, national standards (e.g. CUNA, DIN) and international standards (e.g. ISO, CEN) and verifying those required for the vehicle.

While the crane is operating, the stabilizers (hydraulic if possible) must be used and be in contact with the ground.

As a general rule, the installation of a crane requires the use of a suitable subframe, the construction of which must take into account the general specifications (see Chapter 3.1), and with the dimensions of the sections given in Tables 3.8, 3.9 and 3.10.

The dimensions of the subframe section modulus refer to the maximum total static moment of the crane \( M_G \), deduced from the formula shown in Figure 17.

If the vehicle outfitting requires the use of a section with section modulus greater than that required for the crane (e.g. tipper), this section may also be considered for the crane.

Special cases, whose \( M_G \) value falls within the areas designated by letter "E" in the mentioned Table (or for higher values) must be checked individually each time and must receive specific authorisation from IVECO.

\[
M_G [\text{kNm}] = \frac{g \times (W_L \times L + W_C \times l)}{1000}
\]

\( g = \) acceleration of gravity equals 9.81 m/s\(^2\)

\( W_L = \) mass applied to crane extremity [kg]

\( L = \) horizontal distance between the payload application point \( W_L \) and vehicle centre line [m]
W_c = mass of the crane at its centre of gravity [kg]
I = horizontal distance between centre of gravity of crane and vehicle centre line [m]

The bodybuilder must, case by case, check the vehicle stability and take all necessary precautions for its correct and safe use. The crane manufacturer and the bodybuilder are responsible for defining the type and number of stabilizers as well as selecting the subframe on the basis of the maximum static moment and the position of the crane.

Crane behind cab

The fastening of the reinforcement sections to the chassis must be carried out using the standard brackets (see Figure 18), supplementing them, if necessary, with other fasteners of elastic type (brackets or clamps) in order to keep the flexural and torsional characteristics of the chassis as unchanged as possible. The dimensions of the reinforcement sections to be used for this type of connection are shown in Table 3.8.

On vehicles for road use only, shearing resistant connections may be used for fastening the subframe to reduce the subframe section height. The minimum reinforcement section dimensions for all these applications are given in Table 3.9.

The implementation of constant diameter sections for the entire length of the vehicle is recommended.

The section of the crane subframe can be integrated towards the rear end with that envisaged for another possible superstructure; the length "L_v" must in no case be less than 35% of the wheelbase if the superstructure section diameter is smaller.

In installations of cranes on vehicles with deep cab (e.g. 6 +1), the subframe must continue to underneath the cab (see Figure 2), otherwise, depending on the capacity of the crane, it will be necessary to limit the crane’s range of rotation, so as not to exceed the permissible bending moment from the chassis.

The application of a crane on vehicles for on-off road use requires flexible connections to be made between the chassis and the subframe (see Figure 8) in the front and middle section so as not to excessively constrain the torsional movement of the chassis. The crane is practically connected to the subframe only, the dimensions of the longitudinal sections must therefore be suited to withstand the moment induced during use.

The container or equipment must normally be retracted to arrange the crane behind the cab. In the specific case of tipping equipment, particular attention must be paid to arranging the mounts of the lifting device and the tipper rear hinges which must be as retracted as possible.
### Table 3.8 - Crane behind driver’s cab (subframe secured with shelves or flanges)

<table>
<thead>
<tr>
<th>Model</th>
<th>Frame section [mm]</th>
<th>Total torque ( M ) max [kNm]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>35C</td>
<td>174x70x4</td>
<td>21</td>
</tr>
<tr>
<td>45C, 50C</td>
<td>174x70x4</td>
<td>21</td>
</tr>
</tbody>
</table>

Minimum value of the section modulus of the subframe section \( W_x \) [cm\(^3\)] \(^{(1)}\)

with yield point of the material equal to 360 N/mm\(^2\)

### Table 3.9 - Cranes mounted behind driver’s cab (subframe secured with shear resistant plates)

<table>
<thead>
<tr>
<th>Model</th>
<th>Frame section [mm]</th>
<th>Total torque ( M ) max [kNm]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>35C</td>
<td>174x70x4</td>
<td>19</td>
</tr>
<tr>
<td>45C, 50C</td>
<td>174x70x4</td>
<td>19</td>
</tr>
</tbody>
</table>

Minimum value of the section modulus of the subframe section \( W_x \) [cm\(^3\)] \(^{(1)}\)

with yield point of the material equal to 360 N/mm\(^2\)

---

Close the reinforcement section in the crane assembly area.

\( \textbf{E} = \) To be checked case-by-case. Send IVECO technical documentation with verification of stress and stability.

\(^{(1)}\) When a higher section modulus is required for the superstructure also use the latter for the crane.

**Note** For the dimensions of the profiles see Table 3.2.

### Cranes on rear overhang

The subframe should extend for the entire length of the vehicle to the rear part of the cab; The dimensions of the longitudinal sections are shown in Table 3.10.

Considering the particular distribution of weights on the vehicle (load concentrated on overhang) and to ensure the necessary torsional stiffness for good performance on the road and during the working phase of the crane, the subframe must be suitably stiffened in relation to the crane capacity. Therefore, the use of (see Chapter 3.2) box sections and cross bracings in line with the rear suspension and along the entire length \( L_v \) (see Figure 22) is requested.

The passage between box section s and open sections must be well fitted as shown in Figure 3.

Shear resistant connections (a sufficient number of plates spaced at a maximum distance of 400 mm) must be used in the box section for fastening to the chassis, given that elastic fastenings are used on the front end. Check that the ratio between front axle and rear axle weight respects the limit defined for each vehicle under any load condition (see Chapter 1.15).

Considering that the necessary subframe rigidity depends on various factors (e.g. crane capacity, resting surface dimensioning, vehicle tare weight, chassis overhang), instructions valid for all situations cannot be given. For this reason bodybuilders shall, if necessary, proceed also by testing the vehicle’s stability. If the test results show that rigidity is insufficient, the bodybuilder will adopt suitable precautions so as to obtain correct realisation.

The rear overhang of the crane (measurement \( L_v \) see Figure 22) must be as limited as possible (never exceeding 40% of the wheel-base) to maintain good vehicle drive characteristics and acceptable stress regimes for the chassis.
Table 3.10 - Crane at rear overhang (subframe secured with shear resistant plates)

<table>
<thead>
<tr>
<th>Model</th>
<th>Frame section [mm]</th>
<th>Total torque $M_c \text{ max} [\text{kNm}]$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>35C</td>
<td>114x70x4</td>
<td>32</td>
</tr>
<tr>
<td>45C, 50C</td>
<td>114x70x4</td>
<td>32</td>
</tr>
</tbody>
</table>

$E = \text{To be checked case-by-case. Send IVECO technical documentation with verification of stress and stability.}$

(1) When a higher section modulus is required for the superstructure also use the latter for the crane.

Note For the dimensions of the profiles see Table 3.2.

Removable cranes

The installation of removable cranes on the rear overhang may be carried out according to the specifications of the previous paragraph provided the type of fixing used between the crane and the subframe does not cause additional stress to the vehicle chassis.

Since the vehicle may be used with or without the crane (where permitted), it is recommended that the position of the payload is marked on the superstructure.

If the possibility for the vehicle to tow a trailer is maintained, all the regulations for the correct coupling must be observed.
3.9 INSTALLATION OF TAIL LIFTS

**Note** The installation of tail lifts must be carried out with due regard for the maximum permissible weights on the rear axles of the vehicle and of the minimum load established for the front axle (see Chapter 1.15 (➡ Page 27)). If this is not possible, the rear overhang will have to be reduced.

The tail lift must be fastened with a structure that ensures appropriate weight distribution, especially in the case of specific outfits with no adequate subframe (e.g., box truck bodies, pick-up bodies with cross-members).

In vans, lifts with a capacity of up to 3 kN (300 kg) can be applied after having ensured the presence of reinforcement structures on the chassis; capacities exceeding this value must be assessed on a case by case basis.

The dimensions of the sections to be used can be defined:

1. using Table 3.11, in the presence of trucks with rear overhangs as standard;
2. using the indications provided in Figure 20, with trucks with overhangs not as standard or specific tail lifts (for example, in aluminium);

In the first case the bending moments on the chassis, depending on the capacity of the tail lifts, have average values which are already defined; in the second case, these moments must be calculated from time to time.

**Table 3.11 - Installation of tail lifts**

<table>
<thead>
<tr>
<th>Models</th>
<th>Wheelbase [mm]</th>
<th>Overhang [mm]</th>
<th>Tail lift capacity in kN (kg)</th>
<th>Minimum value of the section modulus of the subframe section Wx [cm³] (1) with yield point of the material equal to 360 N/mm²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>3 (300)</td>
<td>5 (500)</td>
</tr>
<tr>
<td>35S</td>
<td>3450</td>
<td>1355</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>3750</td>
<td>1655</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>4100</td>
<td>1305</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>35C</td>
<td>3000</td>
<td>1240</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>45C</td>
<td>3450</td>
<td>1355</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>3750</td>
<td>1655</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>4100</td>
<td>1715</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>45C</td>
<td>4350</td>
<td>1885</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>4750</td>
<td>2350</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

**Note** S = presence of stabilizers.

For the dimensions of the profiles see Table 3.2.

The checks have been carried out considering a platform with a standard length (H = 1200 mm). For longer platforms, the load on the tail lift must be reduced in proportion to the increase in the length of the platform.

The position of the stabilizers is established according to the values existing in the reference market (S = 950 mm from the rear axle). If the stabilizers are positioned further forward (< 950 mm), the load on the tail lift must be reduced in proportion to the reduction of this distance.

To ensure the necessary strength and rigidity, and especially in the case of overhangs exceeding 1200 mm, the connection between the chassis and the subframe must be made using shear-resistant plates (spaced no further than 400 mm from one another) in the area of the rear overhang, and must continue up to the front support of the rear suspension (see Figure 20).
\[ M \text{ [Nm]} = W_L \cdot A + W_{TL} \cdot B \text{ for tail lifts without stabilizers} \]
\[ M \text{ [Nm]} = W_L \cdot C + W_{TL} \cdot D \text{ for tail lifts with stabilizers} \]

To compensate for frame flexing, which is inevitable when the tail lift is in operation, the bodybuilder may use reinforcement structures with larger dimensions than those indicated in Table 3.11.

This consideration applies even more in the case of high and non-standard overhangs; in this case the necessity to adopt the stabilizers must also be verified.

The possibility of using materials with superior mechanical characteristics requires verification of the total moment of resistance of the chassis plus subframe.

The bodybuilder must carefully assess any variations in the stability and alignment of the vehicle caused by suspension compression and the chassis during all stages in the operation of the tail lift. Always evaluate whether installing stabilizers is advisable even if their use is not rendered necessary by the stresses sustained by the chassis.

The stabilizers must be attached to the support structure of the tail lift, and should be preferably hydraulically operated.

When installing electro-hydraulic tail lifts, ensure that the capacity of the batteries and the power of the alternator are adequate (see Chapter 5.4).

The bodybuilder is also responsible for:

- type-approval of the application of the tail lift on the vehicle.
3.10  TIPPER BODIES (BREAKDOWN RECOVERY)

Application not provided.

3.11  VEHICLES FOR COUNCIL, FIRE PREVENTION AND SPECIAL USES

Application not provided.

3.12  FRONT INSTALLATION OF SNOW PLOUGH ATTACHMENTS

Application not provided.

3.13  APPLICATION OF A WINCH

Application not provided.

3.14  SPECIAL OUTFITS

The bodybuilder must ensure compliance of operations carried out with legal requirements, especially in the case of configurations for the transport of persons.

Installation of aerial platforms

The application of a platform or aerial platform must comply with national standards (for example, CUNA, DIN) and international standards (e.g. ISO, CEN), as well as any specific requirements.

Positioning on the vehicle must respect limits and distribution of permitted load.

Special cases must be assessed individually each time and must receive specific authorisation from IVECO.

The installation of a platform/aerial basket requires the interposition of a suitable subframe. To realise this, in addition to the general characteristics (see Chapter 3.3 (☞ Page 11) and Table 3.2 and Table 3.3), the bodybuilder must:

- assess the maximum static moment and the intended location of the superstructure;
- avoid abrupt sections changes;
- create a fastening solution such as that in Figure 3 or, in cases of high stress, that in Figure 21, in which the first fastening of the subframe is highlighted.

based on the various national legislation.
The bodybuilder must adopt all the precautions to ensure the vehicle's proper use and operational stability. Falling within this context is the responsibility of defining the type and number of the stabilizers together with the manufacturer of the superstructure.

The bodybuilder must therefore also:

- provide vehicle lifting/lower speed control on the stabilizers through appropriate flow control valves in the hydraulic system;
- indicate that it is necessary to limit, as much as possible (3-5 cm), lifting of the front axle of the vehicle from the ground, compatible with the condition of keeping the horizontal alignment.

### Aerial platforms on 35S vehicles

The installation of this outfit on 35S (single-wheel) vehicles is possible with prior adoption of specific reinforcement straps on the chassis, which can be ordered in original with specific opt. No. 74131 or at IVECO Parts with replacement part No. 504267869. Figure 22 shows the view from the bottom.

<table>
<thead>
<tr>
<th>Figure 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reinforcement flap</td>
</tr>
<tr>
<td>2. First subframe fastening</td>
</tr>
<tr>
<td>3. Cab block</td>
</tr>
<tr>
<td>4. Chassis flap section detail</td>
</tr>
</tbody>
</table>
The straps must have a minimum thickness of 4 mm and enough length (at least 1050 mm) to cover the side members of the chassis in front of the cab block area and behind the first fastening point of the subframe (see Figure 22).

The additional flaps must be fastened to the wing of the chassis by means of rivets with a maximum spacing of 110 mm and must be made of high-strength steel.

Note  On vehicles with a shaped fuel tank of 70 or 100 litres (see Chapter 2-17 (Page 32)), installation of the reinforcement straps is not possible due to the interference this would cause between the nail heads and the top wall of the tank.
SECTION 4

POWER TAKE-OFFS
Contents

4.1 GENERAL INFORMATION ............... 5
POWER TAKE-OFFS

4.1 GENERAL INFORMATION

On New Daily Electric, given the absence of the gearbox and the heat engine, PTOs actuated mechanically cannot be fitted. However, it is possible to install PTOs which are actuated by electric motors powered at the service system voltage (12V) or the drive system voltage (nominal 370V).

The 12V service line is equipped with two DC-DC converters which replace the alternator and draw energy from the high voltage. The power peak of each converter is 1 kW. If greater power is required, it is possible to install an additional converter of equal power, the installation of which however must be technically shared and authorised by IVECO.

New Daily Electric has the capacity to power uses/systems which can operate in direct current at 370V; the power supply can be drawn on the "+" and "-" bars located in the DC Protection Module. This module (basically, a small electric panel) is equipped with a pre-installation which allows entry of the user cables to be installed and powered.

There are metal plugs which must be replaced with watertight bulkhead feed-throughs (IP67) of the same type as those already installed for the cables to ensure the same degree of protection against water and dust.

The cables which power the bodybuilder user from the "+" and "-" battery bars (370V) must be protected with fuses, of a suitable size, fitted directly in the module or in the external module as close as possible to the previous one. The introduction of these fuses inside the Protection Module is to be agreed upon with and authorised by IVECO as it can compromise the thermal balance of the module.

<table>
<thead>
<tr>
<th>Component code</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HV line safety fuse (315A)</td>
<td>F45</td>
</tr>
<tr>
<td>2</td>
<td>Power steering relay</td>
<td>T1</td>
</tr>
<tr>
<td>3</td>
<td>Power steering protective fuse (16 A)</td>
<td>F41</td>
</tr>
<tr>
<td>4</td>
<td>Electric heater protective fuse (32 A)</td>
<td>F42</td>
</tr>
<tr>
<td>5</td>
<td>Protective fuse for the DC/DC 1 converter, HV side (10 A)</td>
<td>F43</td>
</tr>
<tr>
<td>6</td>
<td>Protective fuse for the DC/DC 2 converter, HV side (10 A)</td>
<td>F44</td>
</tr>
</tbody>
</table>
### POWER TAKE-OFFS

#### 4.1 GENERAL INFORMATION

<table>
<thead>
<tr>
<th>Component code</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Protection module door open auxiliary switch</td>
<td>SQP</td>
</tr>
<tr>
<td>8</td>
<td>Ground on IS0ESA</td>
<td>me</td>
</tr>
<tr>
<td>A</td>
<td>HV power from drive battery 3</td>
<td>–</td>
</tr>
<tr>
<td>B</td>
<td>HV+ power from drive battery 3</td>
<td>–</td>
</tr>
<tr>
<td>C</td>
<td>HV power from drive battery 2</td>
<td>–</td>
</tr>
<tr>
<td>D</td>
<td>HV+ power from drive battery 2</td>
<td>–</td>
</tr>
<tr>
<td>E</td>
<td>HV power from drive battery 1</td>
<td>–</td>
</tr>
<tr>
<td>F</td>
<td>HV+ power from drive battery 1</td>
<td>–</td>
</tr>
<tr>
<td>G</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>H</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>I</td>
<td>Not used (Cap)</td>
<td>–</td>
</tr>
<tr>
<td>L</td>
<td>Not used (Cap)</td>
<td>–</td>
</tr>
<tr>
<td>M</td>
<td>DC/DC transformer 2 power</td>
<td>–</td>
</tr>
<tr>
<td>N</td>
<td>Electric heater power</td>
<td>–</td>
</tr>
<tr>
<td>O</td>
<td>Power steering power supply</td>
<td>–</td>
</tr>
<tr>
<td>P</td>
<td>DC/DC transformer 1 power</td>
<td>–</td>
</tr>
<tr>
<td>Q</td>
<td>HV power supply drive inverter</td>
<td>–</td>
</tr>
<tr>
<td>R</td>
<td>HV+ power supply drive inverter</td>
<td>–</td>
</tr>
<tr>
<td>S</td>
<td>Connection to the C01 connector for the communications module</td>
<td>–</td>
</tr>
</tbody>
</table>
SECTION 5

ELECTRONIC SUB-SYSTEMS
### Contents

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<th>Page</th>
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<td>5.2 FUSES AND RELAYS</td>
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<td>24</td>
</tr>
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</table>
ELECTRONIC SUB-SYSTEMS

5.1 SYSTEM INTERVENTIONS

Note  Any change to vehicle layout absolutely requires repeating vehicle type approval.

Main components of the electric drive system

When carrying out interventions which involve the drive system, even temporarily:

- electrically disconnect all traction batteries and the super-capacitor, ensuring they have been fully charged (100%) in advance

- protect the electronic equipment and the wiring, in particular the high voltage equipment marked with a yellow triangle with a bolt of lightning and orange wiring and sheaths with the designated mechanical and/or thermal guards

- at the end of outfitting, reconnect all the components and carry out the isolation test according to Annex 4 to the Regulation ECE 100.
If welding interventions are required (for example: arc welding) on the vehicle, the following equipment must be mandatorily disconnected, in this sequence:

1. 12V service battery
2. Battery management system MBS control unit
3. super-capacitor SMI control unit
4. battery 1 BMS control unit
5. battery 2 BMS control unit (if present)
6. battery 3 BMS control unit (if present)
7. Traction inverter

and, if possible, also the other components described in Figure 1.

To disconnect the equipment, adhere strictly to the sequence:

**12V service battery**
Disconnect the negative pole from the 12V service battery.

**Battery management system MBS control unit**

Disconnected the MBS control unit AMP 16 connector.
**Super-capacitor SMI control unit**

Disconnect the connectors (1) from the SMI control unit (2) installed on the supercap module.

**Battery 1 BMS control unit**

Disconnect the connectors (1) from the BMS control unit (2) installed on the battery module.

Repeat this operation on any other battery modules present.

**Traction inverter**

Disconnect the signal connector/power supply from the traction inverter as indicated in the photo.
5.1 SYSTEM INTERVENTIONS

**Figure 4**

*Traction inverter signal connector*

**Figure 5**

*Opening of the traction inverter signal connector*
Opening of the signal connector

Disconnection of the signal connector
Disconnection of the signal connector

After having completed the modifications, all the connectors and the negative pole of the service battery must be reconnected according to the sequence:

1. the remaining connectors if disconnected and then the connector of the traction inverter
2. battery 3 connector (if installed)
3. battery 2 connector (if installed)
4. battery 1 connector
5. connector of the super-capacitor
6. MBS connector
7. negative pole of the 12V service battery

Reactivate the systems by starting the vehicle via the ignition key or connecting the three-phase charging socket.
**Note**  The vehicle is equipped with FZ-type traction batteries operating at high internal temperature (up to 320 °C). When the vehicle is not connected to the electric mains, the batteries use their energy to maintain the temperature as close as possible to the minimum operating temperature (approx. 255 °C). On the basis of the ambient temperature, the batteries charged to 100% will discharge fully within 5 / 10 days; therefore, if there is no electric vehicle charging station near to where outfitting is being carried out and if the work times exceed the duration indicated above, work must be suspended once or more than once to allow the energy to be reintegrated and to allow the operating temperature to be maintained. Vice versa, if the batteries are allowed to go 5 / 10 days without being recharged, they will no longer stay warm and will begin to cool until ambient temperature is reached. If this condition occurs, the vehicle will no longer be able to move independently and will need to be towed (forklift truck, tractor, etc.). To return the vehicle to full service, it must be connected to the electrical mains for at least 24 hours, taking at least 16 of those 24 hours to return the battery system to the required temperature and 8 for them to be recharged.

5.2 **FUSES AND RELAYS**

For information regarding the location and description of the fuses and relays installed on the vehicle, refer to the paragraph "Fuses and Contactors" in the Use and Maintenance Manual.

5.3 **BODYBUILDER CONNECTORS**

Given the specific nature of the electrical system, connectors by-passing the drive system are not permitted on the New Daily Electric.

For the connection of the bodybuilder installations, connectors 61071A and 72075A are used, branched from the electrical system which is shared with conventional vehicles. These can be accessed after having removed the trim of the passenger side storage compartment.
Bodybuilder 20-pin connector, blue (61071A)

![Image of connector](image)

Existing part on the vehicle (dwg. 500314810)  
Counterpart to be coupled (dwg. 500314817)

### Table 5.1

<table>
<thead>
<tr>
<th>Male contact code</th>
<th>Female contact code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>500314820 EZ</td>
<td>500314823 EZ</td>
<td>cable 0.35 to 0.5 mm²</td>
</tr>
<tr>
<td>500314821 EZ</td>
<td>500314824 EZ</td>
<td>cable 0.75 to 1.5 mm²</td>
</tr>
<tr>
<td>1/05907/44 EZ</td>
<td>500314825 EZ</td>
<td>cable 2.5 mm²</td>
</tr>
</tbody>
</table>

### Table 5.2 - Basic functions of connector 61071A

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Cable code</th>
<th>Signal</th>
<th>Connected to</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Engine shut down</td>
<td>7772</td>
<td>Input Max 10 mA</td>
<td>BCM F/22</td>
<td>+ 12 V = engine stop Open wire = no action</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Service braking</td>
<td>1176</td>
<td>Output Max 500 mA (with decoupling diode)</td>
<td>BCM D/57</td>
<td>+12 V = brake activated no signal = brake not activated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Vehicle at standstill</td>
<td>0000</td>
<td>Output Max 500 mA (with decoupling diode)</td>
<td>BCM H/32</td>
<td>Ground = vehicle stopped no signal = vehicle is not stationary</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Parking braking</td>
<td>6662</td>
<td>Output Max 500 mA (with decoupling diode)</td>
<td>BCM F/44</td>
<td>Ground = parking brake engaged (1) no signal = parking brake not engaged</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Battery positive K30+</td>
<td>7772</td>
<td>max 15 A</td>
<td>BCM E/19</td>
<td>Positive protected by fuse on Body Computer - F33</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Side Marker Output</td>
<td>3220</td>
<td>Output Max 500 mA</td>
<td>Relay managed by BCM</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Alcohol Lock</td>
<td>7772</td>
<td>–</td>
<td>Alcohol lock relay</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>K15+</td>
<td>8879</td>
<td>Output 5 A</td>
<td>BCM G/12</td>
<td>Positive with key protected by fuse on Body Computer - F49</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Reserved</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>13</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 5.3 BODYBUILDER CONNECTORS

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Cable code</th>
<th>Signal</th>
<th>Connected to</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Ground K31-</td>
<td>0000</td>
<td>Output max 15 A</td>
<td>–</td>
<td>Connection to ground LM6</td>
</tr>
<tr>
<td>18</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) If the "parking brake engaged" signal indicates "ground", it means the parking brake has not been fully released. Therefore a residual braking torque on the rear axle cannot be excluded. IVECO does not recommend use of the signal as an indication of a stationary vehicle.

It is mandatory to include a 10 kOhm pull-up resistor between 61071A / pin 11 (signal K15) and 61071A / pin 05 as outlined in Figure 10.

![Figure 10](image)

1. Outfitting
2. Connector 61071A

Bodybuilder 12-pin connector, black (72075A)
Table 5.3

<table>
<thead>
<tr>
<th>Male contact code</th>
<th>Female contact code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>500314820 EZ</td>
<td>500314823 EZ</td>
<td>cable 0.35 to 0.5 mm²</td>
</tr>
<tr>
<td>500314821 EZ</td>
<td>500314824 EZ</td>
<td>cable 0.75 to 1.5 mm²</td>
</tr>
<tr>
<td>105907/44 EZ</td>
<td>500314825 EZ</td>
<td>cable 2.5 mm²</td>
</tr>
</tbody>
</table>

Table 5.4 - Basic functions of connector 72075A

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Cable code</th>
<th>Signal</th>
<th>Connected to</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Emergency light</td>
<td>1114</td>
<td>Max 500 mA</td>
<td>BCM H/8</td>
<td>intermittent positive with hazard lights</td>
</tr>
<tr>
<td>2</td>
<td>Programmable speed limiter;</td>
<td>0000</td>
<td>Input Max 10 mA</td>
<td>BCM H/41</td>
<td>Activation of programmable speed limiter Ground = programmable speed limiter activated Open wire = no action</td>
</tr>
<tr>
<td>3</td>
<td>Ground for Multiple State Switch</td>
<td>0000</td>
<td>n.a.</td>
<td>Connected directly to the door control unit</td>
<td>Outswinging door opening signal</td>
</tr>
<tr>
<td>4</td>
<td>Speed signal (B7)</td>
<td>5517</td>
<td>BCM D/56</td>
<td></td>
<td>Mandatory to introduce 5 kΩ pull-up (1) Use signal K15 of 61071A/pin 11 Pulse Signal, see the description in Table 5.5</td>
</tr>
<tr>
<td>5</td>
<td>Door status signal</td>
<td>6676</td>
<td>Input Max 500 mA</td>
<td>BCM H/23</td>
<td>–</td>
</tr>
<tr>
<td>6</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Horn</td>
<td>0000</td>
<td>Output Max 10 mA</td>
<td>BCM 8/28 BCEM D/51</td>
<td>Remote activation of horn Ground = horn active Open wire = no action</td>
</tr>
<tr>
<td>8</td>
<td>Multiple switch</td>
<td>6606</td>
<td>n.a.</td>
<td>BCM F/56 Emergency handle A/7</td>
<td>–</td>
</tr>
<tr>
<td>9</td>
<td>Door status</td>
<td>6625</td>
<td>n.a.</td>
<td>BCM F/42 Door control device A/7</td>
<td>–</td>
</tr>
<tr>
<td>10</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>K30+</td>
<td>7772</td>
<td>n.a.</td>
<td>Battery distributor Pin 2</td>
<td>–</td>
</tr>
<tr>
<td>12</td>
<td>K30+</td>
<td>7772</td>
<td>n.a.</td>
<td>Battery distributor Pin 3</td>
<td>–</td>
</tr>
</tbody>
</table>
Mandatory introduction of a 5kΩ Pull-up Resistor as well as a diode as outlined in Figure 13.

The pull-up resistor and the diode must be fitted by the bodybuilder.
The resistor must be inserted between 72075A / Pin 4 and 61071A / Pin 11.
Without the pull-up resistor no B7 signal is available.

Note
Given the specific nature of the New Daily Electric, it is recommended that IVECO is consulted to agree upon the interfacing requirements with the various connectors.

The B7 output provides the signal relating to the speed according to [ISO16844-2].
Table 5.5 - Tachimetric signal characteristics

<table>
<thead>
<tr>
<th>Function</th>
<th>Parameter</th>
<th>min</th>
<th>max</th>
<th>Unit of measurement</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tachograph output B7</td>
<td>Voltage $U_{\text{low}}$</td>
<td>1.5</td>
<td></td>
<td>V</td>
<td>$I = 1 \text{ mA}$</td>
</tr>
<tr>
<td></td>
<td>Voltage $U_{\text{high}}$</td>
<td>5.5</td>
<td></td>
<td>V</td>
<td>$I = 1 \text{ mA}$</td>
</tr>
<tr>
<td></td>
<td>Frequency ($1/T$)</td>
<td>1.6</td>
<td></td>
<td>kHz</td>
<td>Square wave</td>
</tr>
<tr>
<td></td>
<td>Pulse duration ($t$)</td>
<td>0.64</td>
<td>4</td>
<td>ms</td>
<td></td>
</tr>
</tbody>
</table>

1. Speed signal (terminal B3) of the movement sensor fitted on the gearbox
2. Temporal diagram and form of the pulse speed signal (terminal B7) from tachograph
a. Pulse delay: max 40 $\mu s$ ± 10 $\mu s$ jitter

Note

On vehicles without tachograph DTGO, the B7 signal is not available at speeds below 5 km/h.

It is however possible to obtain this signal at speeds exceeding 0.5 km/h if, on contacting the IVECO Service, a tachograph sensor is installed and the Body Computer is reconfigured.

On vehicles with tachograph MTCO this operation is not permitted.

5.4 GROUND POINTS

The New Daily Electric has more ground points compared to those present on conventional versions. However, considering the number and the specific nature of the electrical/electronic components which make up the electric drive system, and also considering the fact that the electromagnetic compatibility levels of the vehicle must not be compromised, authorisation is given to use just one of the ground points used for conventional versions (where present in the Electric version).
Position of ground points on vehicle

- **M1.** Power ground below cab access step
- **M2.** Power ground on side member
- **M3.** Power ground on fire guard
- **M4.** Power, engine compartment ground near front right headlight
- **M5.** Power, engine compartment ground near front left headlight
- **M6.** Power ground, in the cab, wall below dashboard
- **M7.** Power ground, in the cab, wall below dashboard
- **M8.** Power ground, in the cab, wall below dashboard
- **M8S.** Signal ground, in the cab, wall below dashboard
- **M9.** Power ground on fire guard
- **M10.** Power, engine compartment ground near front left headlight
- **M11.** Power ground on side member
- **M12.** Power ground on engine crankcase, left side
- **M13.** Power ground, engine compartment, left side

The original ground connections of the vehicle should never be altered; in cases where these connections must be moved or new ground points added, use the holes present on the chassis to the extent possible, taking care to:

- mechanically remove - either by filing and/or with a suitable chemical based solution - the paint on both the chassis and terminal side, thus creating a contact surface free of indentations and edges;
- paint the area between the terminal and metal surface with a suitable high conductivity paint;
- connect to ground within 5 minutes after application of the paint.

As regards the signal related ground connections (e.g. sensors or low-absorption devices), do not use the standardized points. Under no circumstances use standardized points for engine ground connection and chassis ground connection.

Additional signal grounds must be positioned at different points from the power ground.
The negative leads connected to a ground point in the system must be as short as possible and must be connected to each other in a "star" formation, while tightening must be done in an orderly and adequate manner.

As far as electronic components are concerned, the following instructions should be followed:

- Electronic control units must be connected to the system ground when equipped with metal housings.
- The negative cables of the electronic control units are to be connected to a system ground point, connected to the negative terminal of the battery.
- The analogue grounds (sensors), while not being connected to the system ground/negative terminal of the battery, are to have good conductivity. Consequently, particular care should be given to terminal parasitic resistances: oxidation, scratches, etc.
- The metal braid of the shielded circuits must be in electrical contact only at the control unit side to which the signal is to be sent.
- With junction connectors (Figure 15) the unshielded sections "d" must be short as possible;
- The cables must be routed in such a way as to be parallel to the reference plane, as close as possible to the chassis/body.

*STELLA* connections of various negatives with the system ground
Electromagnetic comparability

It is recommended that electrical, electro-mechanical and electronic devices which comply with the following immunity requirements for electromagnetic emissions, both irradiated and conducted, are used, as shown below.

The level of electromagnetic immunity of the electronic devices equipping the vehicle at a distance of one metre from the transmitting aerial must be:

- 50 V/m immunity for devices performing secondary functions (not impacting on direct vehicle control), for frequencies varying from 20 MHz to 2 GHz
- 100 V/m immunity for devices primary secondary functions (not impacting on direct vehicle control), for frequencies varying from 20 MHz to 2 GHz;

The maximum excursion allowed for transient voltage with appliances powered at 12 V is +60 V, measured at the terminals of the artificial network (L.I.S.N.) if tested at the bench; otherwise, if tested on the vehicle, the excursion must be recorded in the most accessible location close to the disruptive device.

**Note**  Devices powered at 12 V be immune to interferences such as negative spikes of -300 V, positive spikes of +100 V, bursts of +/-150 V.

They must operate correctly during the phase when voltage drops to 5 V for 40 ms and to 0 V for 2 ms.

They must also resist the load dump phenomena up to 40 V.

The maximum radiated emission levels measured at the bench and the levels of conducted emissions generated by devices and also by 12 V power supplies are given in the following table:
### Table 5.6 - Electromagnetic emission levels

<table>
<thead>
<tr>
<th>Type of emission</th>
<th>Type of transducer</th>
<th>Type of disturbance</th>
<th>Type of detector</th>
<th>Frequency range and limits acceptable in dBμV/m</th>
<th>Unit of measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>radiated</td>
<td>Aerial at a distance of 1 metre</td>
<td>Broadband</td>
<td>Almost peak</td>
<td>150-300 kHz</td>
<td>63</td>
</tr>
<tr>
<td>radiated</td>
<td>Broadband</td>
<td>Peak</td>
<td>5.4-12 MHz</td>
<td>48</td>
<td>34</td>
</tr>
<tr>
<td>radiated</td>
<td>Narrowband</td>
<td>Peak</td>
<td>76-120 MHz</td>
<td>41</td>
<td>34</td>
</tr>
<tr>
<td>conduit</td>
<td>LISN 50 Ω 5 μH 0.11 μF</td>
<td>Broadband</td>
<td>Almost peak</td>
<td>80</td>
<td>52</td>
</tr>
<tr>
<td>conduit</td>
<td>Broadband</td>
<td>Peak</td>
<td>93-120 MHz</td>
<td>70</td>
<td>45</td>
</tr>
</tbody>
</table>

Use electrical/electronic equipment in compliance with the UNECE directive on electromagnetic compatibility. Only components with certified approval and with mark "e" are allowed: the "CE" marking is not sufficient.

By way of example, the mark prescribed by the current UNECE 10R3 on electromagnetic compatibility in the automotive field is shown below:

![Figure 18](image)

\[ a \geq 6 \text{ mm} \]

The values in the table are only to be considered respected if the device comes form "IVECO Spare Parts" or it has been certified as per the international standards ISO, CISPR, VDE etc.

Whenever equipment is used which runs on mains power (220 V AC) for its primary or secondary source of power, it must be checked to ensure that its characteristics are in line with IEC regulations.
5.5 CURRENT DRAWS

In general it is advisable to:

- use suitable protection fuses in the vicinity near the current draw;
- protect the additional cables with designated sheaths or corrugated tubing.

▶ It is absolutely forbidden to draw current from unauthorised points. FIRE HAZARD.

Current sample from the CBA2 control unit in the engine compartment

Inside the CBA2 there are two fuses (FF and FG) reserved for the bodybuilders; terminals (HI and MI) downstream of these fuses are the only authorised points for current draw (see Figure 19).

![Diagram of CBA2 control unit](image)

<table>
<thead>
<tr>
<th>HI</th>
<th>Current take off point protected by fuse FF</th>
</tr>
</thead>
<tbody>
<tr>
<td>MI</td>
<td>Current take off point protected by fuse FG</td>
</tr>
</tbody>
</table>

Fuses FF and FG have a flow rate of 30 A each. If necessary, they can be replaced with ones of a higher capacity respecting the indication of a maximum total current draw (sum of the two fuses) equal to 130 A.

**Note** Each connection on the CBA2 must strictly maintain the integrity and correct positioning of the protective cover.

**Fuses**

- Fuses on the CBA1 control unit
Table 5.7 - List of fuses on CBA1

<table>
<thead>
<tr>
<th>Location</th>
<th>Amperage [A]</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>150</td>
<td>Power supply CBA2</td>
</tr>
<tr>
<td>2</td>
<td>200</td>
<td>Power supply SCM and bodybuilders</td>
</tr>
<tr>
<td>3</td>
<td>500</td>
<td>Starter</td>
</tr>
<tr>
<td>4</td>
<td>80</td>
<td>Body Computer power supply</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>TGC (opt)</td>
</tr>
</tbody>
</table>

- Fuses on the CBA2 control unit
Table 5.8 - List of fuses on CBA2

<table>
<thead>
<tr>
<th>Location</th>
<th>Amperage [A]</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2</td>
<td>150</td>
<td>SCM Power supply</td>
</tr>
<tr>
<td>3</td>
<td>30</td>
<td>Bodybuilders pre-installation</td>
</tr>
<tr>
<td>4</td>
<td>30</td>
<td>Bodybuilders pre-installation</td>
</tr>
<tr>
<td>5</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>6</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>7</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>8</td>
<td>40</td>
<td>ABS</td>
</tr>
</tbody>
</table>

5.6 ADDITIONAL CIRCUITS

The additional circuits must be separated from the vehicle and protected by means of a specific fuse.

The cables to be used must be:

- of appropriate sizes and equipped with good original insulation;
- connected to the original system by means of tin joints equivalent to the original ones, protected with sheaths (not PVC) or intubated in polyamide conduits of type 6;
- installed protections from shock, heat, rubbing with other components (in particular with the sharp edges of the bodywork);
- secured separately with insulated cable clamps (e.g. nylon) and at suitable intervals (approx. 200 mm).

The passage through crossbars and/or sections must provide special cable raceways or protections; it is not possible to drill the chassis and/or the bodywork.

In case of external panels, use a specific sealant both on the cable and on the panel to prevent water, dust and fumes from infiltrating.

Where possible it shall also be provided a different cable path that transfers interference signals with high absorbed intensity (e.g. electric motor, solenoid valves) and low absorbed intensity susceptible signals (e.g. sensors); for both must be remained a positioning as close as possible to the metallic structure of the vehicle.

Plug and terminal connections must be protected, resistant to weathering, and executed using components of the same type as those utilised originally on the vehicle.

**Note** The section of the cables must be suitably sized based on the current absorbed, the length of the cable, the voltage drop and the type of fuse used; intervention of the protection for overload or for short circuit must be guaranteed along the entire length of the protected line.

Use cables and fuses with the characteristics shown in the following table in accordance with the current draw:

Table 5.9- Use of cables and fuses according to the current drawn

<table>
<thead>
<tr>
<th>Max. continuous current (1) (A)</th>
<th>Cable cross-section (mm²)</th>
<th>Fuse capacity (2) (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–4</td>
<td>0.5</td>
<td>5</td>
</tr>
<tr>
<td>4–8</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>8–16</td>
<td>2.5</td>
<td>20</td>
</tr>
<tr>
<td>16–25</td>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>25–33</td>
<td>6</td>
<td>40</td>
</tr>
<tr>
<td>33–40</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>40–60</td>
<td>16</td>
<td>70</td>
</tr>
</tbody>
</table>
5.6 ADDITIONAL CIRCUITS

<table>
<thead>
<tr>
<th>Max. continuous current (1) (A)</th>
<th>Cable cross-section (mm²)</th>
<th>Fuse capacity (2) (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60–80</td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>80–100</td>
<td>35</td>
<td>125</td>
</tr>
<tr>
<td>100–140</td>
<td>50</td>
<td>150</td>
</tr>
</tbody>
</table>

(1) For uses of more than 30 seconds.

(2) Depending on the position and therefore the temperature that may be reached in the housing, choose fuses that can be loaded to up to 70%–80% of their maximum capacity.

⚠️ The fuse must be connected as close as possible to the current take-off point.

Precautions

- Incorrect installation of electrical accessories may affect occupant safety and cause severe damage to the vehicle. Contact IVECO if you have any questions.
- It is necessary to avoid coupling with the signal transmission cables (eg. ABS), for which preferential routing has been provided in order to meet electromagnetic requirements (EMI).
  When grouping several cables together, in order to compensate for lower heat dispersal capacity, the current intensity must be reduced with respect to the nominal value of a single cable.
- Plug and terminal connections must be protected, resistant to weathering, and executed using components of the same type as those utilised originally on the vehicle.
- In the event that a component has to be installed just next to the route of a cable belonging to the original system, make sure that its remains integral and avoid any cuts.

⚠️ Any damage caused by failure to comply with procedure is not covered by warranty.
APPENDIX A

DAILY

PEOPLE CARRIER
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DAILY FOR TRANSPORT OF PEOPLE

A.1 CHASSIS

Transport

The unfitted chassis is not roadworthy and must be transported on a car transporter.

Lifting for transport by ship, train, etc.

When the chassis is loaded onto ships, freight trains, etc. it must only be lifted by acting on the axles or wheels.

Note	It is strictly prohibited to secure the crane cables to the cross or side members.

The chassis must only be secured to the vehicle during transport by hooking the axles and the weight must only be supported by the wheels.

Delivery

Before delivery, the chassis is to be subjected to strict quality controls.

On delivery the bodybuilder must carry out an inspection to detect missing materials or faults which could have occurred during transport.

IVECO does not accept claims after delivery or claims not recorded on the designated forms countersigned by the transporter.

For any claim, please provide the vehicle identification number: this number is on the core of the right chassis side member in the wheel arch near the suspension.

Storage

If the vehicle is to be unused for a long period of time, it must be suitably protected from the elements of the area where it is being kept.

The bodybuilder is responsible in particular for the protection of the dashboard, batteries, fuse boxes and relays, etc., the reliability and duration of which must not be compromised.

Weights and weighing

The design of the bodywork, the position of the seats and the loading compartment must be carried out without exceeding the total maximum permitted loads or the maximum permitted load on the individual axle.

In order to account for fabrication tolerances, the data relating to the weight of the models: 40C, 50C, 65C and 70C have a tolerance of ± 3%. For this reason, before carrying out the fitting, it is a good idea to determine the mass of the vehicle (chassis cab version, van or cowl) and its distribution on the axles.
A.2 GENERAL STANDARDS FOR SECURING THE BODY TO THE CHASSIS

⚠️ Pay careful attention to the presence of high voltage cables (orange).

Note Readers are reminded of the importance of disconnecting all the electrical components before applying any retainers, drilling holes or carrying out welding operations on the chassis.

Particular attention must be paid to the connection points of the chassis elements to the side of the bodywork: since these connection points must ensure a perfect transmission of stress.

At the same time, a localised application of stress determining high pressure on the connection points must be avoided.

The bodywork structure must be considered a load bearing unit together with the chassis; the bending, torsion and thrust stresses must be absorbed by the unit.

This layout is made necessary by the relative flexibility of the chassis. Please contact the IVECO Quality Department for any relevant queries.

The outfitting can be secured to the bodywork by means of welding or retainers to be screwed in and tightened.

Mixed type of connections are not recommended.

In any case, securing the bodywork elements must be carried out using intermediate plates.

A.3 BODYWORK CONSTRUCTION

This chapter provides instructions for the construction of the bodywork, with the most important technical and regulatory aspects.

Defining the bodywork is left to the bodybuilder's criterion depending on requirements.

Main dimensions

The entry and exit angles for all vehicles must be equal to or greater than 7°.

Bodywork construction must allow a steering radius as prescribed by Standard 107/ECE or by the equivalent Standard in force in the country where the registered vehicle will be used.

The vehicles must be equipped with mudflaps at the back of each wheel to a height of 75 mm from the ground.

The bodywork configuration must allow for inspection of the vehicle identification number.

Internal configuration and vehicle capacity

The surface area available for the number of seats for each class of vehicle must comply with prescriptions of Standard 107/ECE or the Standard for the country where the vehicle will be sold.

Driver’s seat characteristics

a) Heating

There must be a sufficient number of hot air vents to demist the windscreen.

b) Sun visor

The driver must be able to make use of a sun visor, the height of which can be adjusted while driving and can be tilted. A wind up sun blind or partially or totally coloured glass can also be fitted.

c) Driver’s seat (if different from the one provided)

It must be possible to adjust the height, incline and longitudinal distance from the steering wheel and each of these adjustments must be independent from the others.

d) Ergonomics of the driver’s seat
If the instrument assembly supplied with the vehicle is disassembled and reassembled in a customized dashboard, it is recommended that the position of the instruments and controls remains unchanged.

Furthermore, since the dashboard supplied complies with the Directive on "signalling, controls and luminous plates", after having made the modifications, the bodybuilder must verify this aspect and obtain new approval if necessary.

When fitting the trim around the driver’s seat, the pedal stroke must not be limited.

**Requirements of materials relating to fire protection (R118.01)**

The materials of the trim used inside the engine compartment must be non-flammable and resistant to fuel or lubricant unless the material has been covered with a water-proof layer.

The rest of the bodywork materials must be "flame retarder" or self-extinguishing depending on the number of passengers the vehicles is permitted to transport and/or the Legislation in force in the country where the vehicle is to be used.

The polyamide conductors or the wiring braids which pass near any hot sections of the engine (manifold or exhaust pipes, turbocharger, etc.) must be protected by a metal shield in either aluminium or stainless steel, with a cladding of insulating material.

**Structure and securing the seat mounts**

Anchoring the seats directly to the floor or the wheel arches is not permitted, therefore a designated structure must be provided (frame) to distribute the stress across the entire surface area of the floor.

**Note** The bodybuilder is entirely responsible for anchoring the seats to the frame as well as carrying out the inspection (destructive) and approval tests.

The figures below show some details of the structures and fastening procedures for the fixed seats and the seats on runners, taken from Dwg. IVECO 5801805133 and 5801752010.

The complete drawings can be requested from www.ibb.iveco.com.
Seat securing floor frame
Example: Installation diagram of fixed seats (see Dwg. 5801805133)
**Example:** Installation diagram of seats on runners (see Dwg. 5801752010)

**Rear baggage compartment**

The baggage compartment volumes is dependent on the maximum permitted technical mass of the vehicle and its axles; Dimensioning and positioning must be validated by structural tests and calculations which are the responsibility of the bodybuilder.
Side access

Constructing a side access with a width exceeding the standard Minibus version must not alter the indeformability of the panel structure of the area concerned.

**Note**  Altering the height of the side door compartment is only permitted for interventions on the top or bottom section of the panel but never on both.

The dimensions of the compartment and the access steps must comply with Directive ECE107.

To prevent any interference with these elements, the AdBlue tank must be shifted slightly along the chassis side member. In this case, in order to use pipes which are longer but generally available from IVECO Parts, it is recommended that one of the positions provided for in the production of Daily Vendor and Minibus is replicated.

Please refer to Section 6 to view the aforementioned positions as well as additional information relating to the AdBlue system and pipes.

If the size of the shift does not allow for the indications provided above, the conversion must be authorized before work is carried out.

Replicated structure and securing handrails

The handrails must be installed in such a way that passengers do not risk any injury, they must be in a contrasting colour and be non-slip. The construction of the handrails and their application on the vehicle must comply with the European Directive 2001/85/EC or ECE107.

The anchoring sections of the handrail onto the original structure of the vehicle must be suitably reinforced.

Wheelchair lift for disabled passengers

For this type of transport, the access door compartment must be equipped with a lift; furthermore, inside the vehicle there must be a reserved area with specific dimensions. In any case, this area must comply with the European Directive 2001/85/EC or ECE107.

If the rear door is to be used for wheelchair access, please refer to the securing methods for the tail lift described in Chapter 3.9 (➤ Page 24).
A.4 SOUND-PROOFING

This topic has not been covered.

A.5 HEATED INSULATION AND CLIMATE CONTROL

Insulation for cold climates

Vehicle insulation for cold climates must ensure that the engine coolant temperature does not fall below 80°C with stable operation.

The thermostat inside the circuit ensures correct engine operation if the opening temperature is 68 ± 2 °C.

If despite the insulation, the engine operates at less than 80°C and insufficient hot water reaches the heater, a preheater able to provide at least 25000 kcal/h is to be fitted.

The preheater is mandatory when the vehicle normally operates at temperatures below 0 °C.

Once engine insulation has been defined, it is necessary to measure its efficiency by testing the capacity of the cooling system and the heating system.

After the tests it may be necessary to carry out fine tuning consisting in:

- increasing the power or the insulation if the heating test temperatures are low;
- increasing the air passage and reducing the insulation if the temperatures obtained during the cooling test are too high.

IVECO is to be informed of the results and is to be consulted in relation to any modifications of the fine tuning.

High temperatures

As regards the thermal insulation, the most critical parts are the areas near the turbocharger, the manifold and exhaust pipes, the silencer and the electric retarder impellers.

When a non-metallic element of the bodywork is near a critical area it must be protected. This protection could consist of a layer of insulating felt covered with an aluminium sheet able to withstand a stable heat of 250°C and with a maximum conductivity coefficient of 0.1 W/mK.

In any case, the minimum distance between a critical point and the insulation must not be less than 80 mm.

When the available space is reduced and above all in order to protect the polyamide pipes and wiring braids, it is recommended that a shield made of aluminium sheet with an insulating sandwich is used, with a conductivity coefficient equal to that of the felt; between the protected element and the shield there must be a minimum separation distance of 20 mm.

In order to maintain a comfortable temperature inside the vehicle, the insulation in the engine compartment/gearbox must have a minimum conductivity coefficient of 0.08 W/mK and a minimum temperature of 85 °C.

This noise-thermal insulation must cover the entire area separating the engine housing and the interior, including the steps, walls and other surfaces through which heat could penetrate.

In areas where noise insulation is not required, for example near the electric retarder, polyurethane foam can be used for thermal insulation as long as it has characteristics similar to those described.

Some points are not critical as regards heat transmission but they must however be considered for the insulation of bodywork elements or systems which may be damaged by excessive temperature.
A.6 CURRENT DRAWS

CBA, transport of people version

The distribution and protection control unit located on the battery has a circuit breaker to interrupt loads in the event of an emergency.

![Figure 5](image)

**Figure 5**

Relay and fuse box on the battery (CBA 1)

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Fuse capacity</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>150A</td>
<td>Power supply CBA 2</td>
</tr>
<tr>
<td>2</td>
<td>200A</td>
<td>Power supply SCM and bodybuilders</td>
</tr>
<tr>
<td>3</td>
<td>500A</td>
<td>Starter and Retarder</td>
</tr>
<tr>
<td>4</td>
<td>80A</td>
<td>Body Computer power supply</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Battery master switch</td>
</tr>
</tbody>
</table>

To restore the original vehicle conditions, restart the vehicle.

A.7 BODYBUILDER CONNECTORS

**Note**  For information relating to the 20 pin connector (61071A), refer to Section 5 - Chapter "Connector 61071A, blue, 20-pin".
12-pin connector (72075A) for transport of people

![Diagram of 12-pin connector](image)

**Table A.3**

<table>
<thead>
<tr>
<th>Male contact code</th>
<th>Female contact code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>500314820 EZ</td>
<td>500314823 EZ</td>
<td>cable 0.35 to 0.5 mm²</td>
</tr>
<tr>
<td>500314821 EZ</td>
<td>500314824 EZ</td>
<td>cable 0.75 to 1.5 mm²</td>
</tr>
<tr>
<td>1/05907/44 EZ</td>
<td>500314825 EZ</td>
<td>cable 2.5 mm²</td>
</tr>
</tbody>
</table>

**Table A.4 - Basic functions of the 12-pin connector 72075A**

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
<th>Cable code</th>
<th>Signal</th>
<th>Connected to</th>
<th>Remarks</th>
</tr>
</thead>
</table>
| 1   | Emergency lights signal               | 1114       | Output 500 mA  | BCM H08      | Emergency light request  
|     |                                       |            | +12V (flashing) = Emergency lights  
|     |                                       |            | Open circuit = emergency lights not requested |
| 2   | Programmable speed limiter;           | 9968       | Input 10 mA    | EDC K22      | Activation of programmable speed limiter  
|     |                                       |            | Ground = programmable speed limiter activated  
|     |                                       |            | Open wire = no action |
| 3   | Outswinging door control status       | 0003       | Output 10 mA   | Door control | Only present with OPT outswinging door  
|     |                                       |            | (interfacing with decoupling diode)  
|     |                                       |            | Ground = outswinging door open  
|     |                                       |            | Open circuit = outswinging door closed |
| 4   | Speed signal (B7)                     | 5517       | BCM D56       | 5 kΩ pull-up  
|     |                                       |            | (1) Use signal K15 of 61071A/pin 11  
|     |                                       |            | Pulse signal, see B7 tachograph signal description |
| 5   | K15 Remote                            | 8879       | Input 500 mA   | BCM G02      | Indicates CDL functions  
|     |                                       |            | (2) |
| 6   | Door status                           | 6676       | Input 10 mA    | BCM H23      | PTO 1 feedback  
|     |                                       |            | Ground = PTO 1 engaged  
|     |                                       |            | Open circuit = PTO 1 not engaged |
| 7   | Horn                                  | 1116       | Output 10 mA   | BCM D51      | Remote activation of horn  
|     |                                       |            | Ground = horn active  
|     |                                       |            | Open wire = no action |
| 8   | Outswinging door emergency handle lock| 6606       | Output 10 mA   | BCM F56      | Only present with OPT outswinging door  
|     |                                       |            | (interfacing with decoupling diode)  
|     |                                       |            | Central locking extension to the emergency handle  
|     |                                       |            | Ground = Door handle jammed  
|     |                                       |            | Open circuit = Opening of the emergency door handle permitted |
### Pin 9: Outswinging door command malfunction
- **Description:** Outswinging door command malfunction
- **Cable code:** 6625
- **Signal:** Input/output 10 mA (interfacing with decoupling diode)
- **Connected to:** BCM F/42 Door control device A/07
- **Remarks:** Only present with OPT outswinging door. Ground = Door malfunction present, Open circuit = No malfunction present. **Note:** The ground signal can also be actuated by the bodybuilder. An error is shown on the display.

### Pin 10: Reserved
- **Description:** Reserved
- **Cable code:** –
- **Signal:** –
- **Connected to:** –

### Pin 11: Emergency control OFF
- **Description:** Emergency control OFF
- **Cable code:** 0000
- **Signal:** Input 100 mA
- **Connected to:** BCM
- **Remarks:** In the presence of central emergency control (opt. 2546). Ground = active emergency, Open wire = no action.

### Pin 12: Emergency control ON
- **Description:** Emergency control ON
- **Cable code:** 0000
- **Signal:** Input 100 mA
- **Connected to:** BCM
- **Remarks:** In the presence of central emergency control (opt. 2546). Ground = active emergency, Open wire = no action.

---

1. Refer to Section 5 - Chapter "Connector 72075A, black, 12-pin".
2. The signal indicates that the central locking system has blocked the doors. It allows the bodybuilder to add an additional deterrence warning light. The functionality is the same as the vehicle deterrence indication.
   - **Indication with at least one door open**
     - For 3 seconds: Flashing signal (3 Hz, duty-cycle at 30%)
     - After 3 seconds: Signal off
   - **Indication with all the doors closed**
     - For 3 seconds: Continuous signal active
     - After 3 seconds: Flashing signal (1 Hz, duty-cycle at 5%)

3. Refer to Section 5 - Chapter "Connector 72075A, black, 12-pin"