

# RECO *eTRAC*

Motrac Industries

# Body Builder Instructions

## Compact Multi Purpose Vehicle



EMISSIELOOS



KRACHTIG



WENDBAAR



COMFORTABEL

## Abbreviations

Abbreviation	Explanation
AC	Alternating Current
CE	Conformité Européenne
DC	Direct Current
OECD	Organisation for Economic Co-operation and Development
ROPS	Roll Over Protection System

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# 1 Safety

## 1.1 General

Always follow the safety and security regulations provided in these instructions when working on the vehicle.



**WARNING** Only qualified personnel is allowed to work on the vehicle and its systems!



**WARNING** For maintenance and repair all information for the service manual(s) must be followed at all times!

**Note:** Always use protective equipment, such as gloves and goggles, to reduce the risk of damage to your skin and eyes. Oils and grease can cause acne and eczema, particularly when old, used and impure.

**Note:** All work carried out on the steering system must be conducted under extremely clean conditions as dirt in the steering system can lead to malfunctioning.

**Note:** When the bodywork is fitted, there must be sufficient space to access and maintain the pressure accumulator, test nipples and filler nipples.

## 1.2 Fire safety

These instructions apply to all types of work on vehicles. Work must be carried out with great caution at all times.

### 1.2.1 Component placement

Fires are caused by a combination of heat, fuel and oxygen. Therefore it is essential to avoid placing electrical components, electrical wires, exhaust pipes, fuel pipes, hydraulic oil hoses and air pipes near to each other. Predictable possible oil leakage should be avoided by shield plates.

### 1.2.2 Working on the vehicle

Cut the main power supply. Clean the working surface and make sure that the workshop area is clean.

### 1.2.3 Hydraulic and lubrication oil

All kinds of fuel, lubrication oils, hydraulic oils and many chemicals are flammable. Therefore always read and follow the instructions given on the package.

All work on the fuel system should be carried out when the engine is cold. Fuel leakages and spillages on hot surfaces and electrical components can cause a fire.

Store oil and fuel soaked cloths and other flammable material in a safe place. Oil soaked cloths are extremely flammable.

### 1.2.4 Low-voltage electrical system

Batteries can develop hydrogen gas, especially during charging. Hydrogen gas is highly inflammable and very explosive. When working with batteries, always make sure that the working area is ventilated.

Smoking, open fires or sparks must be avoided when working on the electrical system.

### 1.2.5 High Voltage electrical system

Any work on the high-voltage battery within the vehicle is not allowed, any disregard results in full warranty voidance. Only Motrac Industries may open the battery housing and only in a safe and controlled environment.

Before working on the vehicle always make sure the high-voltage system is disconnected properly as a guidance the following steps must be executed:

1. Place the vehicle in a safe position, making sure the parking brakes are applied – do not connect to a charger during maintenance and repair;
2. Switch OFF the vehicle;
3. Mark the vehicle and the working area properly and restrict access;
4. Remove the MSD and make sure it cannot be re-installed while working on the vehicle;
5. Wait for 10 minutes;
6. Check whether the installation is voltage free using proper tools;
7. Perform required maintenance while taking care for proper (temporary) storage of potentially dangerous components;
8. Check for any visible damages to the electrical system and check if work on the electrical system is performed and reinstalled correctly;
9. Replace the MSD;
10. Switch ON the vehicle making use of the standard procedure (see User's Manual).

**Note:** National and/or local legislation with respect to working on EV-vehicles must be followed when working on the vehicle at all times. The steps above may only be performed by qualified and suitable personnel.

**Note:** High voltage operations may also present fire hazards:

- Inappropriate equipment for the needed current may become hot enough to melt or combust nearby material.
- The stored energy in a spark or arc may be sufficient to ignite flammable (or explosive) material.

### 1.2.6 Welding and grinding

Always clean paint away from the surface. Make sure that the working area is clean. Never weld near flammable components. It is extremely dangerous to smoke while welding is being carried out.

### 1.2.7 Connecting electrical components

Any kind of incorrect wiring can cause functional problems. In the worst case a fire can be caused. When connecting electrical components, it is important that a correct installation is carried out by using the correct cables, clamps and fuses (see the assembly instructions). Fuses should not use more than 80% of their capacity. If electrical components are connected to already stressed coupling bridges it can result in overloading.

### 1.2.8 Hot surfaces

The areas listed below can become hot enough to ignite any flammable material (hydraulic oil, wood chips and dust, etc.). To avoid the risk of fire, these areas should (where possible) be shielded and the user of the vehicle advised to periodically check for signs of excessive heat and for collections of flammable substances.

- Inverters (motor-controllers)
- Charger(s)
- Cooler(s)
- Motor(s)
- Other (electric) equipment dissipating heat where indicated with the symbol:



**Note:** Shielding of hot surfaces to prevent contact with flammable materials, for instance in case of spillage, is required on the bodywork for this vehicle.

## 1.3 Electrical shock

To prevent electrical shock:

- Always make sure the vehicle is electrically dead when working on the vehicle and/or its sub-systems;
- Never clean the vehicle with high volumes of water (waterhose, other means of flushing with water);
- Prevent water to come in contact with electric parts, components and systems.

## 2 General

### 2.1 General about bodywork

#### 2.1.1 Warranty

The warranty can be invalidated if these instructions are not followed. Motrac Industries may under certain circumstances approve the fitting of bodywork that is not covered by these instructions. A formal approval must be submitted by Motrac Industries before starting any work on the vehicle.

**Note:** It is the responsibility of the body builder that the durability of the body is sufficient for the intended load, load handling and operating area.

#### 2.1.2 Installation

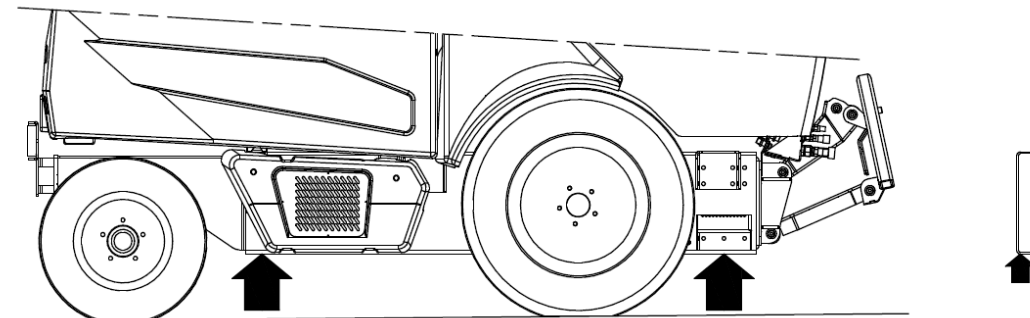
Suitable bodywork is essential if the vehicle is to carry out its tasks safely, efficiently and economically. These bodywork instructions have been drawn up to comply with this overall aim.

**Note:** These instructions are applicable from a technical viewpoint, but due consideration must also be given to national and local regulations as applicable.

**Note:** Components of the original vehicle and its comprising systems should never be altered or damaged in the process of developing or converting the vehicle.

#### 2.1.3 Securing the vehicle

In order to work safe on the vehicle it must be positioned and secured correctly and safely. In order to stabilize the vehicle during working activities the following jacking points are available:



### 2.2 Welding



**WARNING** It is absolutely forbidden to weld on the body or body parts of the original vehicle structure itself!

Welding of a body super structure must be performed as much as possible prior to the installation on the vehicle, where this is not possible the following – general – rules for welding must be followed. If in doubt consult Motrac Industries prior to starting the work. Motrac Industries is not liable for any damage as a result from welding.

#### 2.2.1 General

These instructions apply generally to all types of electric welding work carried out on vehicles. Welding must be done with great accuracy to achieve a satisfactory joint. Care must be exercised to avoid damage, personal injuries and accidents.

Welding on the vehicle should be at a minimum. The welder must be trained, qualified and experienced in vehicle welding work.

### 2.2.2 Electric welding on the bodywork

When welding is being carried out, it is important that the following measures are taken in order to avoid personal injuries or damage to the vehicle:

- The welder must be trained, qualified and experienced in vehicle welding work.
- It is important to prepare the welding area carefully. Heat sensitive components such as piping and cables (electric and air) must either be protected or dismantled. Also protect leaf springs and air bellows.
- The welding area and the location of the welding machine's earth connection must be clean, i.e. any paint, corrosion, oil, grease, dirt, etc. must be removed.
- The welding machine's earth connection should be connected as near to the welding point as possible. The cable clip should be in contact with the material to be welded to prevent damage to any electrical components. If two parts are to be welded together, it is essential that these are connected to the welding machine's earth connection.
- Ensure that no casings of electrical components (e.g. the control unit) come into contact with the welding electrode or the welding machine's earth connection.
- A direct electrical current is generally used for welding.
- Before welding the vehicle must be made voltage free, following the procedure stated in the safety instructions.
- Additionally, all connectors to control units must be disconnected.

## 2.3 Fasteners

Chassis and chassis-related bolts and fasteners have to have a minimal quality of 10.9 or equivalent. Corrosion-protection must be obtained by either



**WARNING** Fasteners with high quality may never be used with a thermo-chemical treatment, danger for hydrogen-embrittlement

## 2.4 Additional holes

In the chassis members, crossmembers, cabin-mounting, cabin structure and battery housing additional holes are not allowed. It is absolutely forbidden to drill or make holes in any other way in the chassis frame flanges, as this creates unacceptable stress concentrations.

### 2.4.1 Permitted extra holes

Extra holes may be drilled – only after written consent from Motrac Industries – for:

- Attachment purposes, at the end of the rear overhang.
- Bodyworks which need more attachment points than offered by the pre-drilled holes,
- Bodyworks which, for some reason, cannot utilize the pre-drilled holes.

The maximum hole diameter is 12 mm. The extra holes should not interfere with any original hole pattern.

## 2.5 Pipes, hoses and fittings

Hose assemblies are used for all types of media. When conveying pressurized air/fluids between components that have large relative movements, hose assemblies are used.

Examples of relative movement:

- Between cab and body
- Between cab and chassis
- Between battery housing and chassis

### 2.5.1 General

- Use only original parts only contact your dealer for availability and prices.
- It is not allowed to change the routing and/or disconnect the pipes and hoses of the original vehicle.
- Avoid crossed pipes under a clamp, as this could cause compression of the pipe. However a maximum compression of 30% of the tube diameter is allowed.
- Avoid crossed pipes which could cause incorrect pipe length and, in case of relative movements, chafing.
- When a clamp point coincides with a previously fitted tie strip, replace the previous tie strip with a new one.
- The clamp must be tensioned correctly.

### 2.5.2 Installation rules to prevent abrasive wear

- Clamp any contact points where relative movement is suspected.
- A hose must have a minimum distance of 10 mm to adjacent parts.
- When brackets are used, the pipes must be placed against the whole surface of the bracket, or clamped with bracket clips.
- The distance between clamps should be a maximum of 400 mm.

### 2.5.3 Clamping of tubes and hoses exposed to heat

- Clamping of hoses and tubes directly onto cooling coils or heat shields is not allowed.
- The distance between hoses and tubes and the above parts must never be less than 10 mm.
- The distance between hoses and tubes and exhaust pipes must be 100 mm or more.



**WARNING** Disconnecting the hydraulic system causes air within the system which will not be automatically vented, this can cause severe damage of the components!

## 2.6 Chassis painting

### 2.6.1 General

The paint used on the vehicle has a total layer thickness of 120 ... 150 µm with a shot-blasted surface preparation.

Used colors:

- RAL7015 for the exterior parts.
- RAL9005 for the interior parts.
- RAL5018 for the external battery housing.

### 2.6.2 Environmental considerations

Always check the local environmental and labor regulations.

### 2.6.3 Choice of paint

- Consult your paint supplier for a suitable paint.
- Read the instructions and information from the paint manufacturer before painting.
- Paint a small surface on a hidden area to test the compatibility of the paints.



**WARNING** Damage to the painting work will cause corrosion!

## 2.6.4 Painting procedures

Follow the painting procedures below to obtain a very durable result, both with regard to corrosion protection and surface finish.

### 1. Cleaning

- Choose the correct detergent for the dirt which is to be removed.
- Make sure the dirty surface can tolerate the detergent.
- Always follow the instructions of the packaging.
- Solvents must not be allowed to come in contact with the plastic glass on lamps when cleaning.
- Rinse accurately with pure water.

### 2. Grinding/sanding

- The chassis must be dry before commencing grinding/sanding.
- Grind/sand the surface properly to obtain surface adhesion.
- Runs, dirt, paint flakes and possible rust must be removed.

### 3. Masking

- Surfaces that are not to be painted must be carefully masked.
- If wheel rims have to be painted, the mating surfaces against the hubs, rims to rims and underneath the wheel nuts must be masked.



**WARNING** The wheels can loosen if the wheel nut mating surfaces against the hubs, rims to rims and underneath the wheel nuts are painted!

Other examples of parts that must be masked:

- Valves
- Operating plungers
- Signs
- Hydraulic hoses
- Cooler surface
- Sealings and sliding joints

**Note:** When painting the chassis, all sensitive surfaces on moving components must be covered. Warranty does not cover damage caused by negligent treatment such as painting of sensitive surfaces.

### 4. Priming

- Make sure that the surface is free from grease and dirt.
- Wipe the surface with a Tac-Rag cloth, before commencing any painting to make sure that the surface is thoroughly cleaned and free from dust.
- When sanding down to bare metal (steel), a primer must be applied.

**Note:** Aluminum, hot-dip and electrical galvanized surfaces require a special primer before applying the top coat.



**WARNING** To maintain correct functionality of the components, do not exceed a temperature of 80 °C when drying the paint. Follow the drying time recommended by the paint manufacturer!

### 5. Top coating

- 2-component paint is recommended.
- Note: When using a 2-component paint a iso-cyanid free hardener should be used if possible.
- Closely follow the recommendations of the paint manufacturer concerning the mixing ratio for the hardener and paint.
- Take care that away-facing and obscured surfaces plus edges are properly coated.

**Note:** Different colors have different hideness.



**WARNING** Do not exceed a temperature of 80 °C for drying the paint!

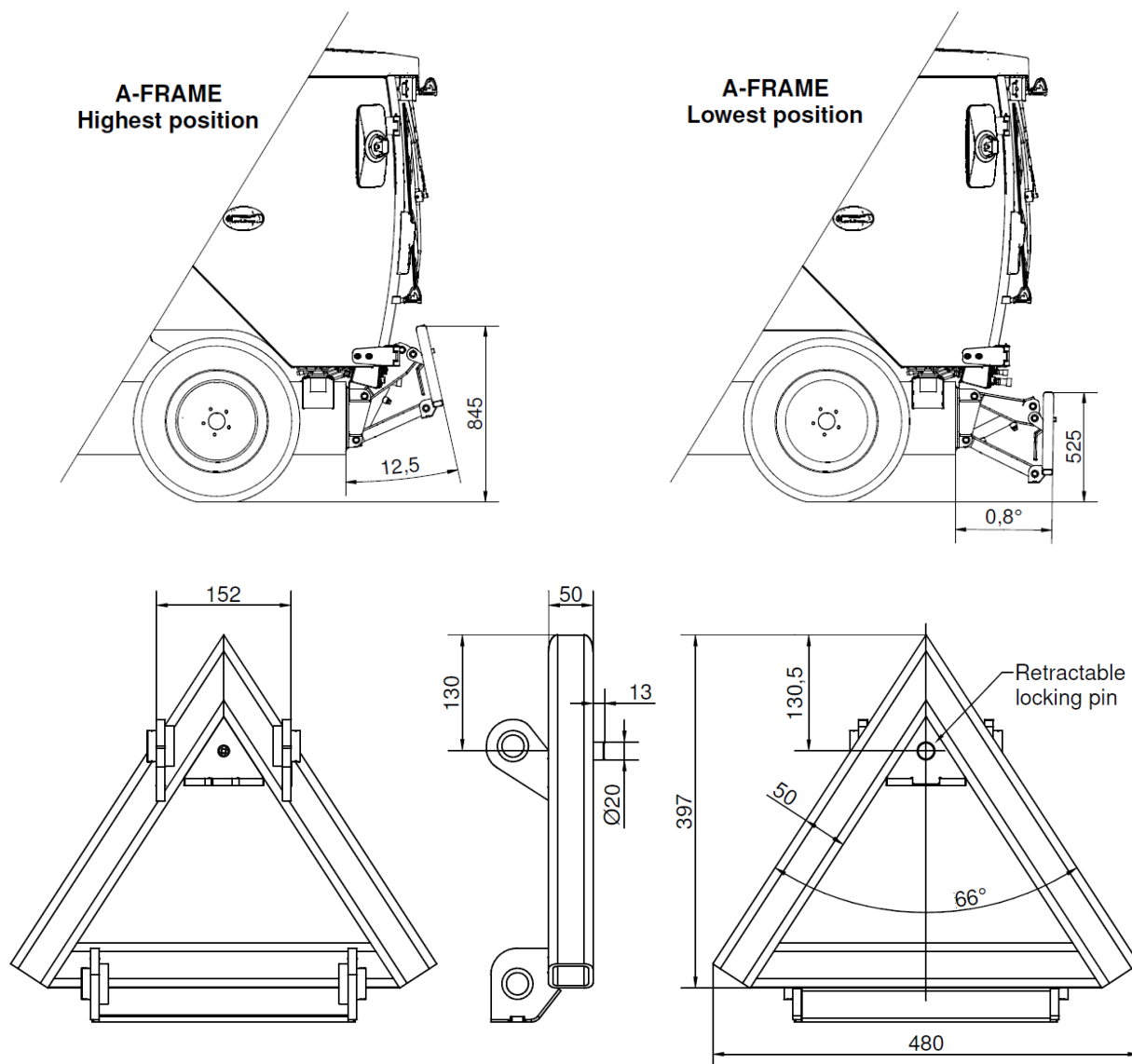
## 3 Installation

### 3.1 General

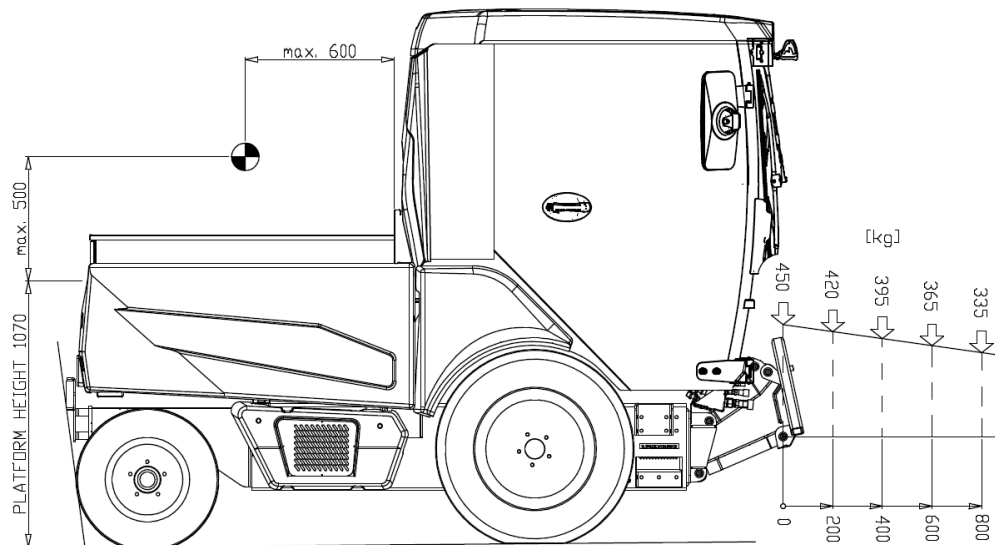
- The minimum distance between the cab and the bodywork on should be 50 mm behind and 75 mm above the cab (measured with the cab in its normal resting position).
- Original hydraulic hoses may not be altered or rerouted.
- The bodywork must not prevent checks and maintenance work being carried out on the vehicle and its components.
- Read through all material regarding the bodywork before any work is carried out.
- Any hydraulic or electric system of the vehicle may never be combined with body builder's system(s).
- All components of the vehicle and its systems may not be repositioned, it is not allowed to modify brackets and/or mountings in any way.
- Modifications to the (positioning) of the components due to interference with the body can only be done after written permission of Motrac Industries. In any other case warranty voids.

### 3.2 Front mounted equipment

Working tools may be carried utilizing the A-frame on the front side of the vehicle:



Maximum load on the A-frame is as follows:



### 3.3 Payload

The admissible payload is depending on the cargo bay variant:

<b>Option A</b>	Max. 150 kg
<b>Option B</b>	Max. 1.000 kg

Never exceed the following axleloads:

Front axle A1	Rear axle A2	Total
2.000 kg	2.000 kg	3.500 kg

The length and position of the bodywork must be calculated to obtain an optimum vehicle. Correct axle loads are obtained by calculation. When calculating the maximum axle loads on a vehicle with, for example, a water containing body, it should be taken into account that the centre of gravity will move as the water is being used or the vehicle is being (un-)loaded otherwise.

**Note:** Always check that the final dimensions of the design, such as overhang and total length, comply with national and local requirements.

The maximum permitted payload per axle is equivalent to the difference between the Permitted A1 and A2 and the Kerb A1 and A2. The payload on the front axle (Payload A1) and rear axle (s) (Payload A2) and the total permissible payload (L) then becomes:

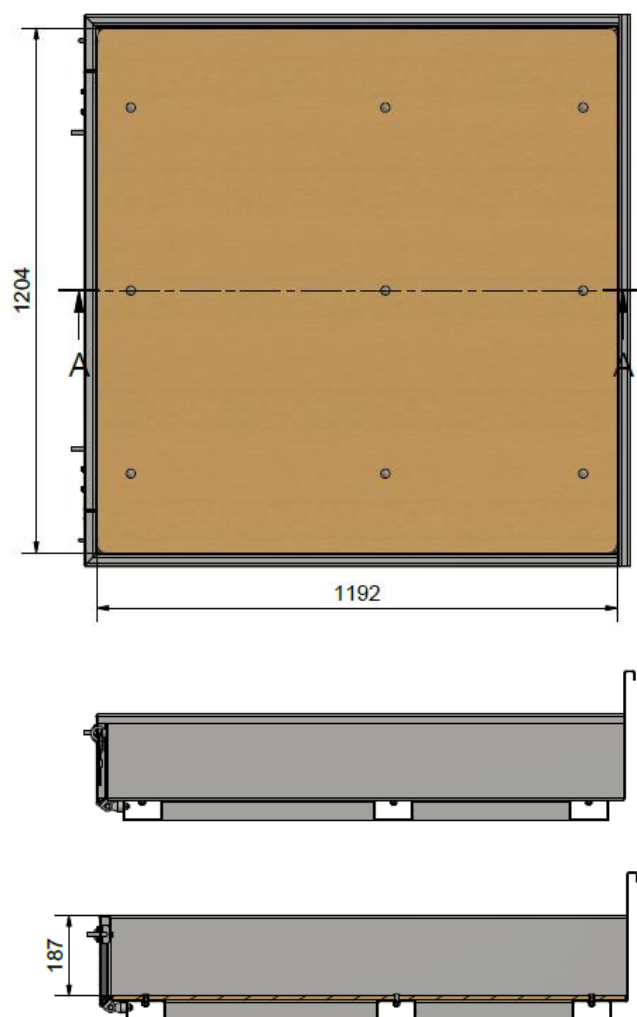
- Payload A1 = Permitted A1 - Kerb A1
- Payload A2 = Permitted A2 - Kerb A2
- Total Payload, L = Payload A1 + Payload A2

The centre of gravity may not exceed the following limits as shown in the figure above. The difference between left-hand-side and right-hand-side wheels of an axle line may never exceed 5% to ensure sufficient stability of the vehicle.

The body builder is responsible for a proper load distribution under all working, operating and environmental conditions.

### 3.4 Cargobay

The vehicle is equipped with a cargo bay for additional material or utilities, dimensions according to figure below:



### 3.5 Towing hook

The vehicle is not developed to be equipped with a towing hook.

## 4 Electrical System

### 4.1 12V DC

A common misconception is that the battery state of charge is the same as its state of health (that a fully charged battery is a healthy battery). This is not necessarily true. State of charge measurement will give an indication of the battery health and whether or not it has been handled correctly.



**WARNING** Battery contains corrosive sulphuric acid. Eye protection should be used when working with battery. Avoid contact of battery fluids with skin and clothing, etc.

Batteries are perishable goods. Check the batteries therefore at least once a month. Ensure that reserve batteries are maintained regularly, especially when the vehicle has left the factory and awaits its arrival at the body builder and or end-customer.

#### 4.1.1 Safety precaution with respect to work 12V DC battery

When working on or with the LV battery, always obey the following safety precautions:

- Always wear eye protection.
- Charging should be conducted in a well ventilated area.
- Smoking is not permitted. Avoid fire and sparks since oxyhydrogen gas develops during charging.
- Always use a battery charger with a voltage limiter to avoid the risk of boiling the batteries, overheating and causing fatal damage to the vehicle electronics.
- Disconnect the batteries before bodywork is performed.

**Note:** Never leave a battery in a discharged state as this can cause damage.

#### 4.1.2 General about low-voltage batteries

- If the vehicle will be standing for several days, it is recommended to disconnect the negative cable from the battery terminal
- Never obstruct the battery cap vents
- To avoid voltage drop and disintegration of the battery poles and terminal clamps, make sure that they are clean and free from oxide
- It is important that they are lubricated with an anti-corrosion agent and that their attachments are checked regularly
- Also the rest of the batteries must be kept clean to avoid creep current and build-up of oxides
- Use the battery as little as possible. Discharging over a long period means that the battery runs at risk of being damaged

#### 4.1.3 Disconnection of the batteries

1. Switch off the ignition
2. Switch off all other electrical loads
3. Make sure the vehicle is not being charged (remove charging cable)
4. Disconnect first the negative cable from the battery terminal

Note that both the 12VDC battery and the traction battery must be disconnected to ensure that the vehicle is electrically dead.

## 4.2 96V DC Traction battery

The 96V DC traction battery must be considered a black-box by the body builder.



**WARNING** Traction battery's voltage is 96V DC – HIGH VOLTAGE – Working on electrical systems with 96V DC requires special education and training: Refer to National or regional legislation for details.

It is not allowed to:

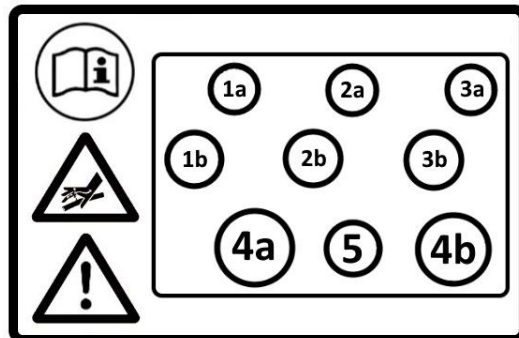
- Open the battery box
- Connect to the 96V DC system in any way
- Modify, splice or re-route HV-cables

Disregarding these will result directly in full warranty void.

## 5 Power Take-Off

### 5.1 Hydraulic system

The vehicle is equipped with a hydraulic power supply next to the A-frame in front of the vehicle.



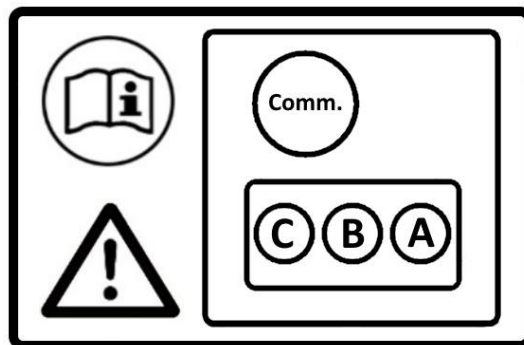
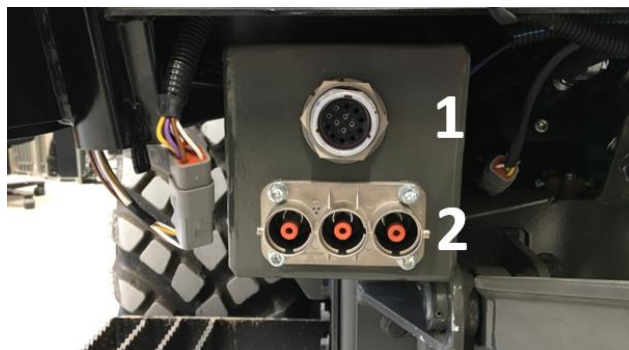
- [1] Hydraulic function 1
- [2] Hydraulic function 2
- [3] Hydraulic function 3
- [4] Hydraulic function 4
- [5] Leak connection

Hydraulic power supply (optional)	
Max. continuous flow	45 lpm
Max. continuous pressure	max. 200 bar
Hydraulic tank	70 l

For more information refer to the User's Manual.

## 5.2 Electrical system

Electrical power for tools and body are available to be used by the body builder.



- [1] Communication connector
- [2] Main power connector

Electric power supply	
Nominal voltage	3-phase AC depending on utility and usage
Continuous current	230 A
Peak current	405 A

For more information refer to the User's Manual.

Only tools which run access to adjusting parameters must be done through the display within the cabin. The interfacing software is in development continuously, contact your dealer.

Currently the following tools are available:

- Brushcutter
- HOAF Weedsteam

In development:

- Mowing deck (1,80m) GMR, available end 2021
- Mowing deck (1,80m) Wiedenman, available Q2-2022

## 6 Other

### 6.1 CE Marking

The vehicle is CE-marked acc. to the Machine Directive as being a piece of mobile machinery. Due to the full-electric powertrain and battery technology there is no C-standard applicable.

### 6.2 Road admission

National procedures must be followed to obtain road admission wherever required. A national procedure s required in such case. Contact your distributor for more information.

### 6.3 ROPS

The cabin of the RECO eTRAC™ is tested according to the OECD Code7 standard for Roll Over Protection Systems (ROPS). Any structural modifications to the cabin, its mounting and its connection to the chassis are not allowed.

# RECO *eTRAC*



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