

EV4

OWNERS

MANUAL

EV4 Mountain Cart

AERO-SERVICE Jacek Skopiński

Dereniowa 4/69

02-776 Warsaw

POLAND

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Warning! Please read this manual before first use and observe safety regulations first. To ensure proper operation of the vehicle for a long time, follow the maintenance instructions carefully.

If you are left with any questions after reading this manual, AERO-SERVICE will gladly answer them.

1. PRELIMINARY INFORMATION

1.1. Content and addressees of this manual



This technical publication is a manual for EV4 MOUNTAIN-CART manufactured by AERO-SERVICE.

The manual refers to „main application of the device”, together with all the technical information about exploitation, assembly and maintenance of the device. This manual is addressed to all users of the EV4 MOUNTAIN-CART.

In case of loss or a case where it will no longer be usable it is recommended to order a copy of the manual from the producer.



The manufacturer reserves the right to these materials and intellectual property rights and prohibits, even in part, copying and/or disclosure of the content of the documentation without the manufacturer's permission.

1.2. Symbols

To ensure safety of the users, and to avoid any interference in operation, safety instructions must be followed. These symbols will help you achieve that:

SYMBOL	MEANING	DESCRIPTION
	Danger	This symbol indicates situations of grave danger, neglect of which can seriously jeopardize the risk of loss of health and safety of persons.
	Danger	This symbol indicates serious electrical hazards which may negatively impact health or even cause death.
	Warning	This symbol indicates the need for warning or attention to key functions or important information.

1.3. Cooperation with the user of EV4

The manual reflects the equipment and the technical condition of the vehicle at the time of commissioning. Any change in this manual will result in the shipment of a copy of the manufacturer's new instruction to each customer and such documentation should be stored with this manual.

1.4. Compliance with safety requirements

AERO-SERVICE declares with all responsibility, that the product is compliant with following standards:

- PN-EN ISO - 12100:2012 Safety of vehicles -- General design principles -- Risk assessment and risk reduction.

EV4 MOUNTAIN-CART meets the requirements of the following European Directives:

- The Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 concerning machinery and certain parts of machinery.
- Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.

The devices have been CE marked and have been issued a declaration of conformity for them - due to the requirements set out in the above directives.

Nameplate attached to the device:



2. Vehicle description

2.1. Manufacturer contact details:

AERO-SERVICE Jacek Skopiński
Dereniowa 4/69
02-776 Warsaw, Poland
Tel. +48 603 397 810
e-mail. ev4@ev4.pl

2.2. General description

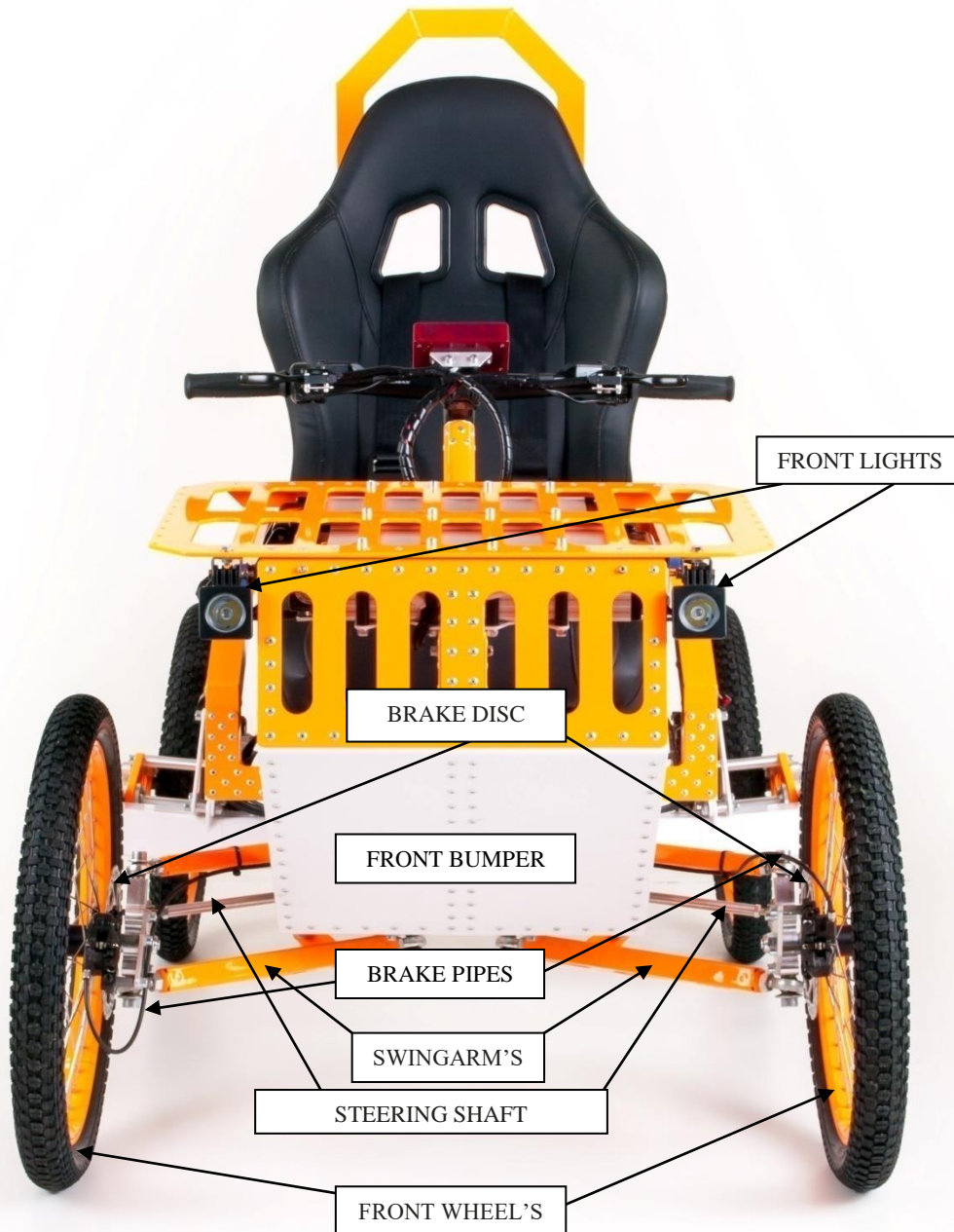
Electric four wheel vehicle designed to maximize availability for everyone, adjusted so it can be used also by disabled users in all terrain environment. The vehicle is used to transport people.



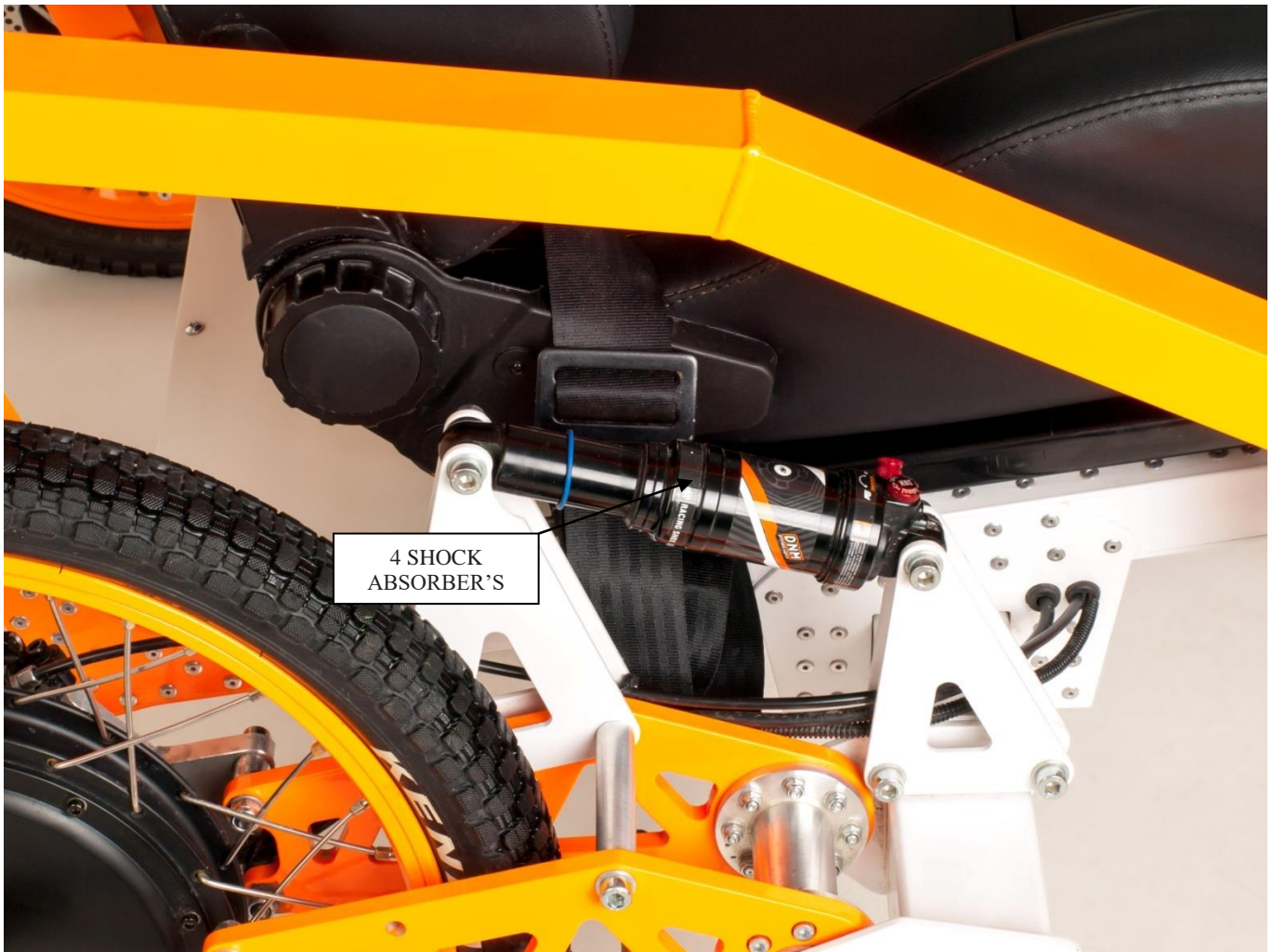
Diag. 1 EV4 MOUNTAIN-CART



Diag. 2 MAIN PARTS



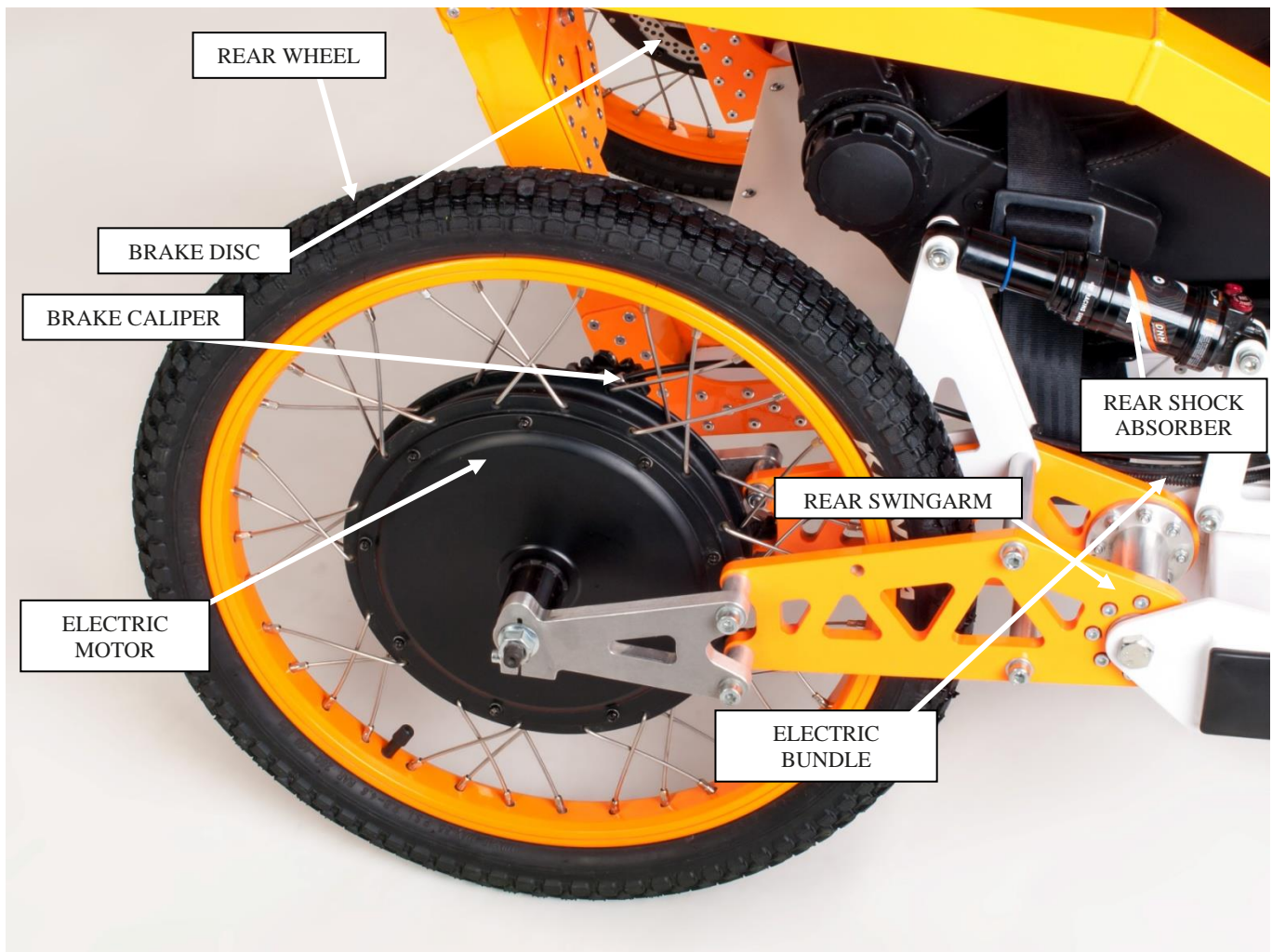
Diag. 3 MAIN PARTS



Diag. 4 MAIN PARTS



Diag. 5 MAIN PARTS



Diag. 6 MAIN PARTS

3. Proper use



The vehicle can only be used to transport people with appropriate sizes and age to operate electric vehicles. The weight of the person and the baggage must not exceed 130 kg. The front luggage compartment is designed to carry luggage of a maximum weight of 20 kg..



WARNING! It is forbidden to use the vehicle contrary to its purpose.

Use for other purposes is not allowed. Proper use also includes all activities related to the correct and safe operation and maintenance of the EV4. Accordingly, the user is obliged to:

- read the manual and adhere to its recommendations and warnings;
- understand how the vehicle operates and maintain safety;
- avoid accidents.

4. Warnings for unauthorised use



WARNING! The manufacturer is not responsible for the consequences of improper use.

- EV4 MOUNTAIN-CART is a vehicle with power up to (2x2000W) 4000W and speeds up to 40 km/h. Customers need to check your local traffic laws.
- Incorrect use of EV4 may cause personal injury. Use protective clothing such as suitable footwear, gloves, helmet, knee pads, elbow pads, safety goggles, etc.
- Be very cautious when using this product on: unhardened, wet, slippery and uneven surfaces.
- It is forbidden to drive under the influence of alcohol, intoxicants, narcotics, and drugs which don't allow driving vehicles.
- EV4 is an electric vehicle, so using it in rain or in humid conditions is not recommended. Driving into puddles should be avoided.
- It is prohibited to: pour water onto the EV4, store it in rain, wash it and clean it under running water. Removing dirt is possible using a damp cloth.
- The vehicle can only be used to transport people with appropriate sizes and age to operate electric vehicles.
- The vehicle owner is fully responsible for any damages resulting from the use of the EV4
- EV4 is not designed for extreme driving. It is forbidden to perform jumps and other dangerous evolutions. You cannot speed it up and stop too fast.
- Speed must be adapted to field conditions. Longer braking distances should be considered for slippery surfaces.
- During quick turns watch out for losing traction. Danger of accident.
- Overload: do not overload the vehicle's power package and overload the vehicle itself. The weight of the driver along with the luggage must not exceed 150 kg. Overload and excessive load can damage the vehicle and the power unit.
- Driving at the same time is only permitted by one person. Driving in two or more is prohibited.
- Before each use of the vehicle, the driver is obliged to inspect the technical condition of the vehicle. Make sure all components are in place, no screws and nuts missing. Check the front and rear brakes.

5. Residual risk



Residual risk is risk that still remains after all precautions have been taken.

When observing such recommendations as:

- read the manual carefully;
- do not place hands in between moving parts ;
- do not make any modification or repairs to the electrical parts of the vehicle;
- do not operate the vehicle without reading the manual first,
- secure the EV4 from persons unauthorized to operate it,

Residual risk can be eliminated without endangering people and the environment. There is a residual risk in case of non-compliance with the specified recommendations and guidelines.

6. Technical information

Main technical information is shown in the table below.

TECHNICAL INFORMATION	
INPUT VOLTAGE	110-240 V
OUTPUT VOLTAGE	36V
FREQUENCY	50-60 Hz
MAXIMUM POWER OUTPUT	4000 W
WEIGHT	85 KG

7. Putting to use

7.1. Minimal requirements for vehicle operation



EV4 is an electric vehicle, so using it in rain or in humid conditions is not recommended. Driving into puddles should be avoided. It is prohibited to: pour water onto the EV4, store it in rain, wash it and clean it under running water . Air temperature when charging battery must be within 0-40 degrees Celsius and use and storage within the range of -20 to + 40 degrees Celsius.

7.2. Before use



Take special care when starting up the vehicle; check all safety and security functions. Remember to read this manual carefully and first observe safety regulations.

Check before use:

- ✓ Tire pressure,
- ✓ Shock absorber pressure.
- ✓ Battery charge.
- ✓ Check for suspension malfunctions.
- ✓ Check for steering control malfunctions.
- ✓ Check for brake system malfunctions.

8. Operator requirements

The person selected and authorized to operate and maintain EV4 must have the appropriate knowledge. Service work may only be performed by persons who have manual skills and are familiar with the operating instructions. To properly handle EV4 the user must:

- Know how to use and seek information in this document;
- Know how the EV4 functions;
- Have a medical condition consistent with the certificate given by a physician,
- The vehicle can only be used to transport people with appropriate sizes and age to operate electric vehicles
- The person selected and authorized to operate and maintain EV4 must have the appropriate knowledge.
- The weight of the driver with the luggage must not exceed 150 kg. Overloading can damage the vehicle and drive train.
- Recognize abnormalities in functioning and, if necessary, take necessary measures to remove them.
- Persons using the vehicle must good eyesight, reflexes, and can make quick decisions.

9. Use of Personal Protective Equipment

To avoid injury when using EV4, wear protective equipment. Equipment includes bicycle helmet, knee and elbow pads. Protective gloves are recommended during repairs and maintenance. When using Mountain Cart you should wear seatbelts all the time.

10. Use

10.1. How to operate the EV4

When driving the EV4 MOUNTAIN-CART, sit on the seat, hold your hands on the handle bar. Feet need to be kept on the foot rest under the handlebar. Keep your hands and feet away from all the mechanical components of the vehicle such as steering suspension or drive system. Do not touch: vehicle mechanisms drive system and vehicle suspension during operation. Before using the EV4 MOUNTAIN-CART for the first time, charge the battery to 100%.

When starting you should sit comfortably with you legs in front on the foot rest. Speed up by pressing the black acceleration button and brake with hand levers located on the both sides of the handle bar. This activities are done with the thumb of your right hand when accelerating and both hands when braking. The vehicle stops after the right and left levers of the brake are pressed simultaneously, ensuring that the wheels are not locked. This may cause loss of steer ability and sliding. When getting out of stopped vehicle it is good to keep one brake lever “locked” so the vehicle is stable.

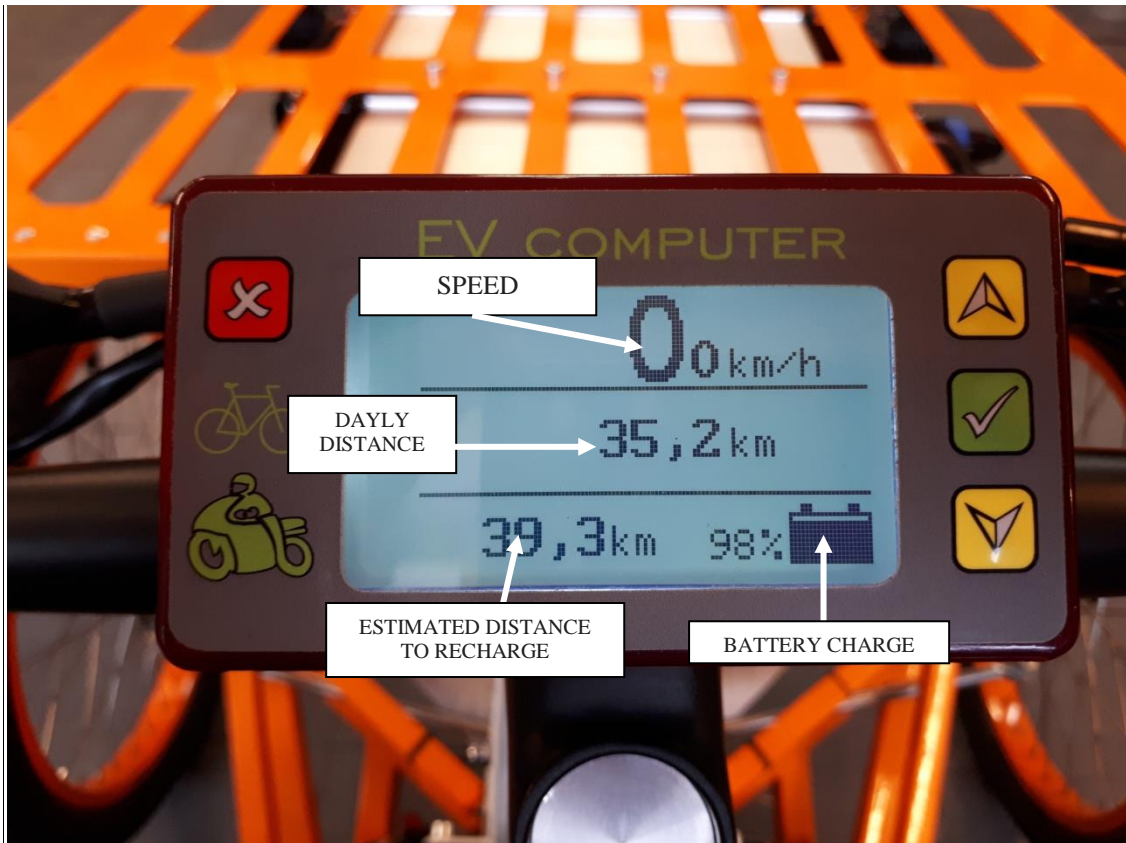


Diag. 7 THE HANDLEBAR

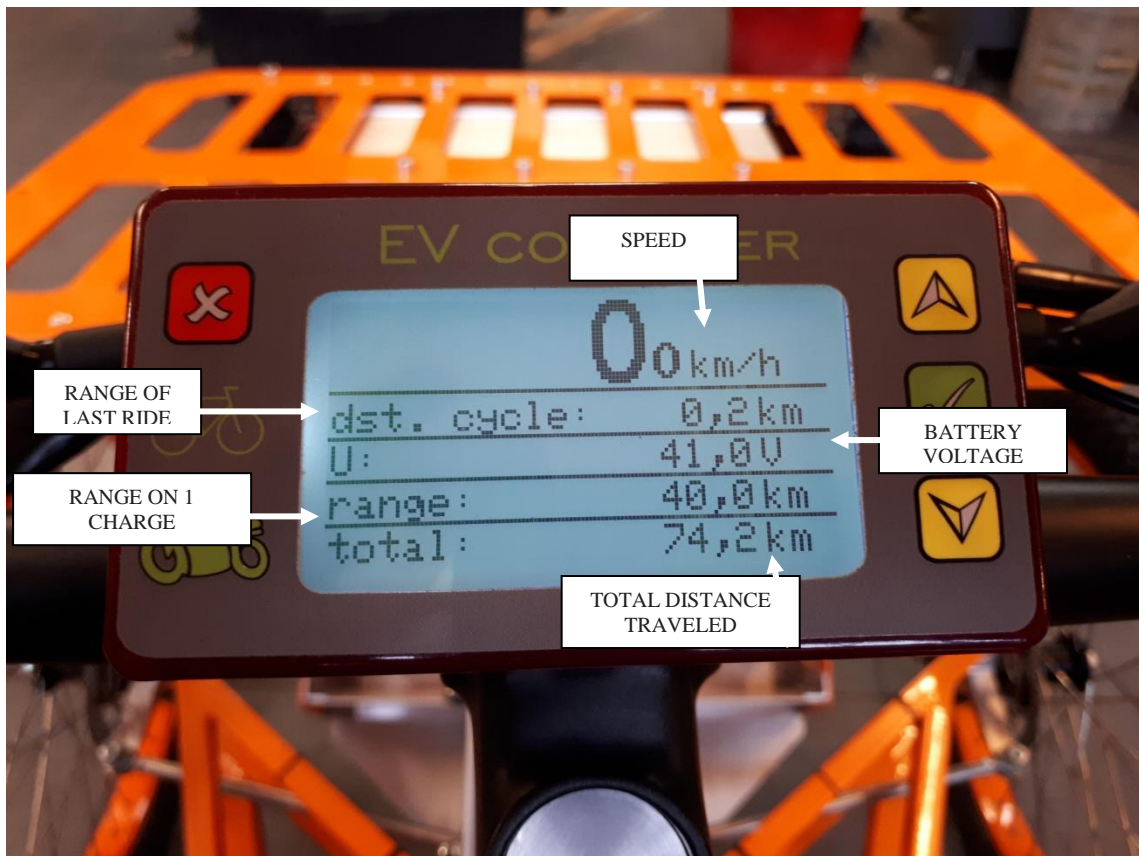
10.2. Essential activities during use of EV4 MOUNTAIN-CART

1. Put the ignition key in and turn to the right (power will be turned on)
2. Sit on the seat and put your hands on the handlebar, secure seatbelt.
3. Feet need to be resting on foot rest
4. Put the key into the ignitron and turn fully to the right
5. The vehicle is ready to run when the computer is turned on.
6. To move forward press the acceleration lever .
7. To move in reverse press the reverse button on than press the acceleration lever.
8. The speed of the vehicle is adjusted with the acceleration lever.
9. If you do not start driving within one minute of turning on the ignition, the engine controller will shut down automatically. This protects the battery from unnecessary discharge. In this case, the vehicle's computer remains on but in order to restart the engine controller, switch the ignition switch on and off again. The controller will switch off automatically after the end of the drive, for example, if one forgets to switch off the ignition switch (after about 1 minute).
10. After driving, turn off the vehicle with a key and secure it against unwanted use, children, etc.

10.3. Display description



Diag. 8 COMPUTER DISPLAY 1



Diag. 9 COMPUTER DISPLAY 2

10.4. Charging and fuse description

EV4 MOUNTAIN-CART is supplied with a two Li-Ion 36V, 24Ah batteries. In order to properly charge the batteries, use the charger supplied with the vehicle. You will need a special 36 V charger for Li-ion batteries. It is forbidden to use a charger other than the original charger. Using a charger other than the original charger may result in electrical damage, short circuit, fire and personal injury. It may also cause permanent damage to the battery and the vehicle's electrical system.

The charger must first be connected to the vehicle then to the network. Charging socket is located on the battery pack under handle. Pull the battery handle and then plug in the charger plug.

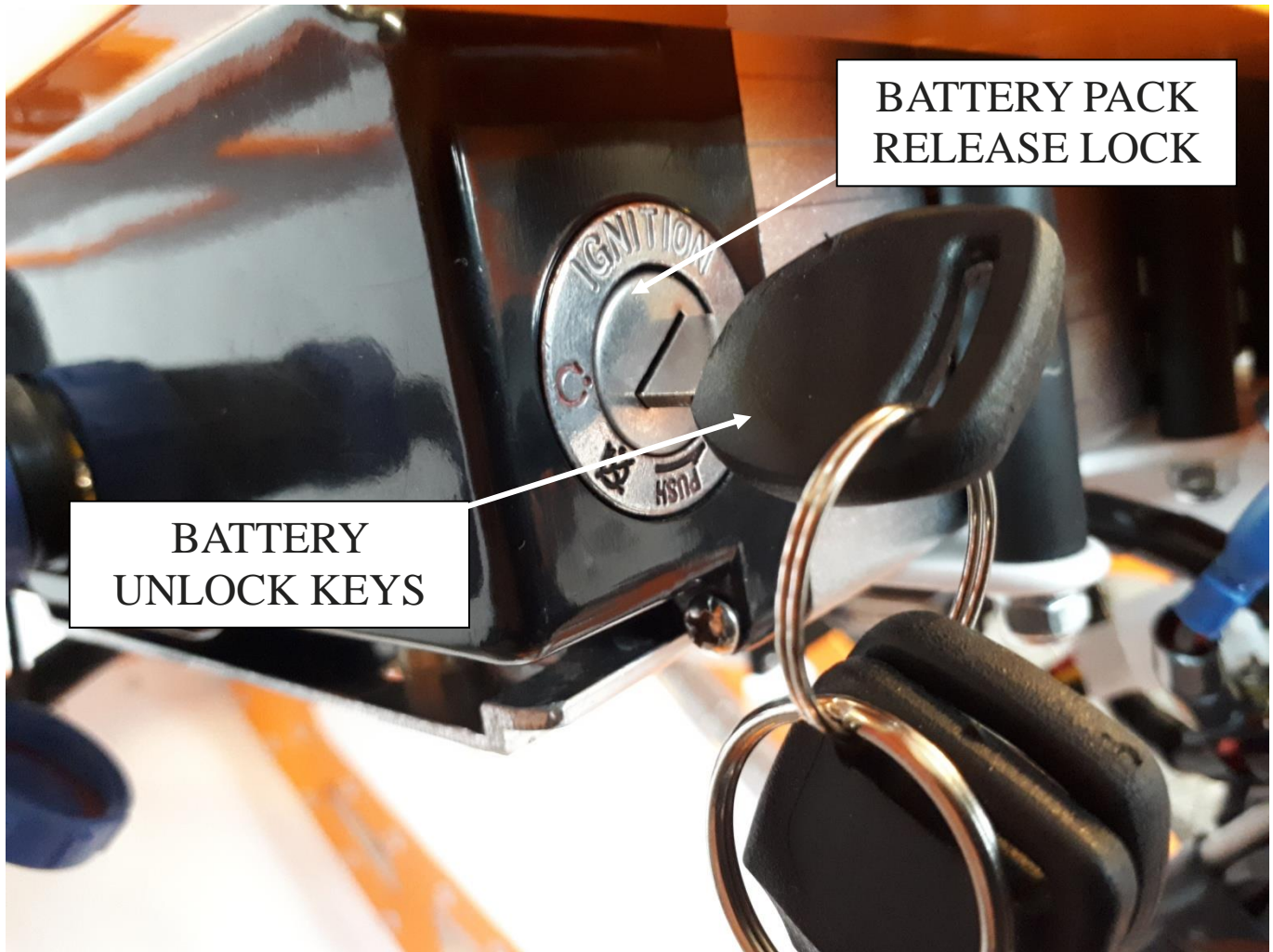
The charger must be disconnected from the vehicle when the vehicle is fully charged (charge will not occur after 100%). It is indicated with a green lamp on the charger. Secure the vehicle's charging socket when charging is complete. After the charge is complete, one can start the vehicle with the key. Disconnect the charger before starting the vehicle. Do not connect any equipment or short connectors to the charger socket. The charger for the EV4 does not charge other batteries.

EV4 vehicles have fuses for electrical wiring. Fuses are located inside the battery casing. If the vehicle cannot be started or the battery won't recharge check whether the fuse has been blown. For this purpose dismantle the frame cover with the screws and check the fuse in the battery. Locating the cover and fuse holder bolts is shown in the photographs.

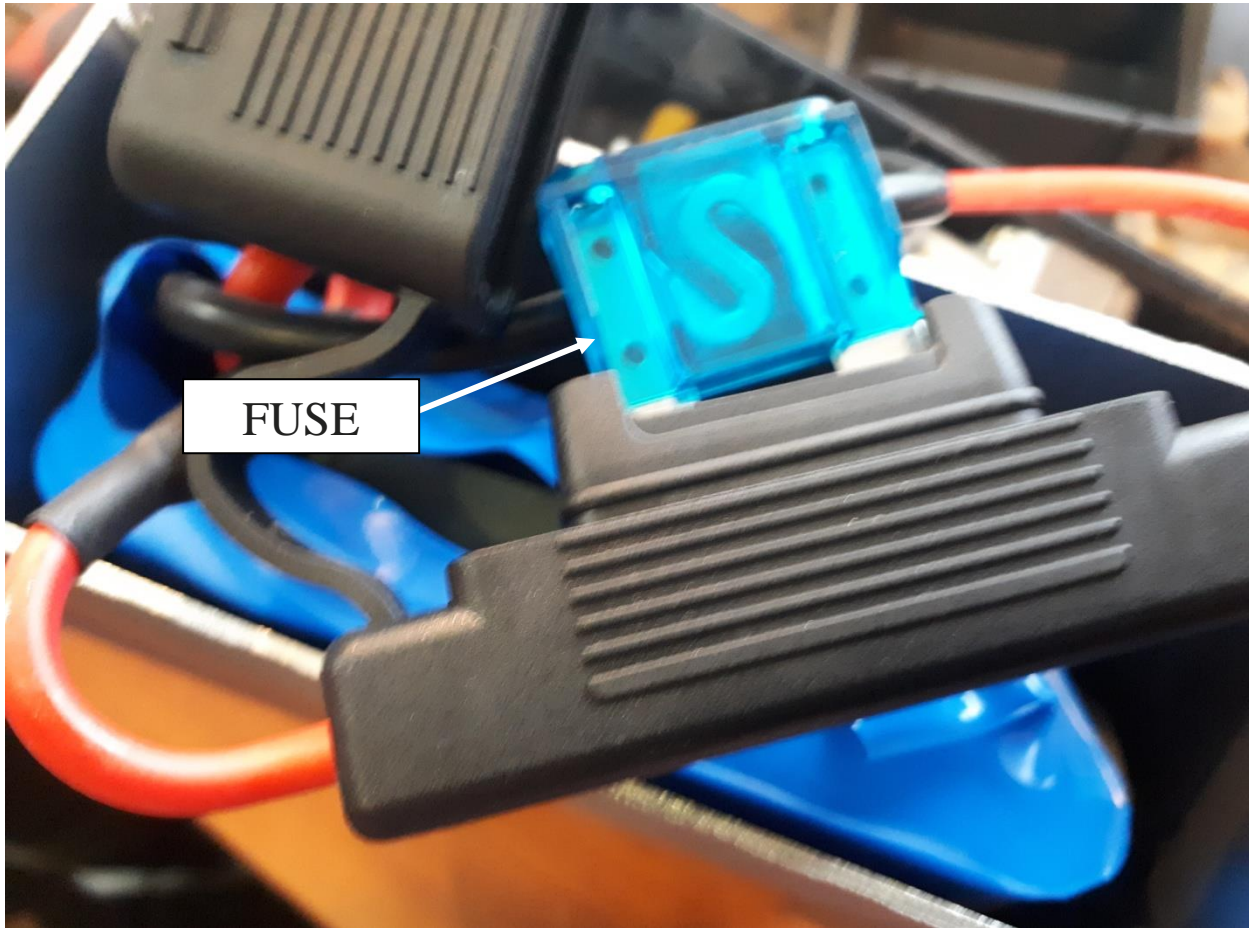
If the vehicle cannot be started and the fuse is working, contact the manufacturer / service. Do not perform repairs on your own. The EV4 MOUNTAIN-CART uses 60A. When it is necessary to replace the fuse, it is necessary to use a new one with the same current.



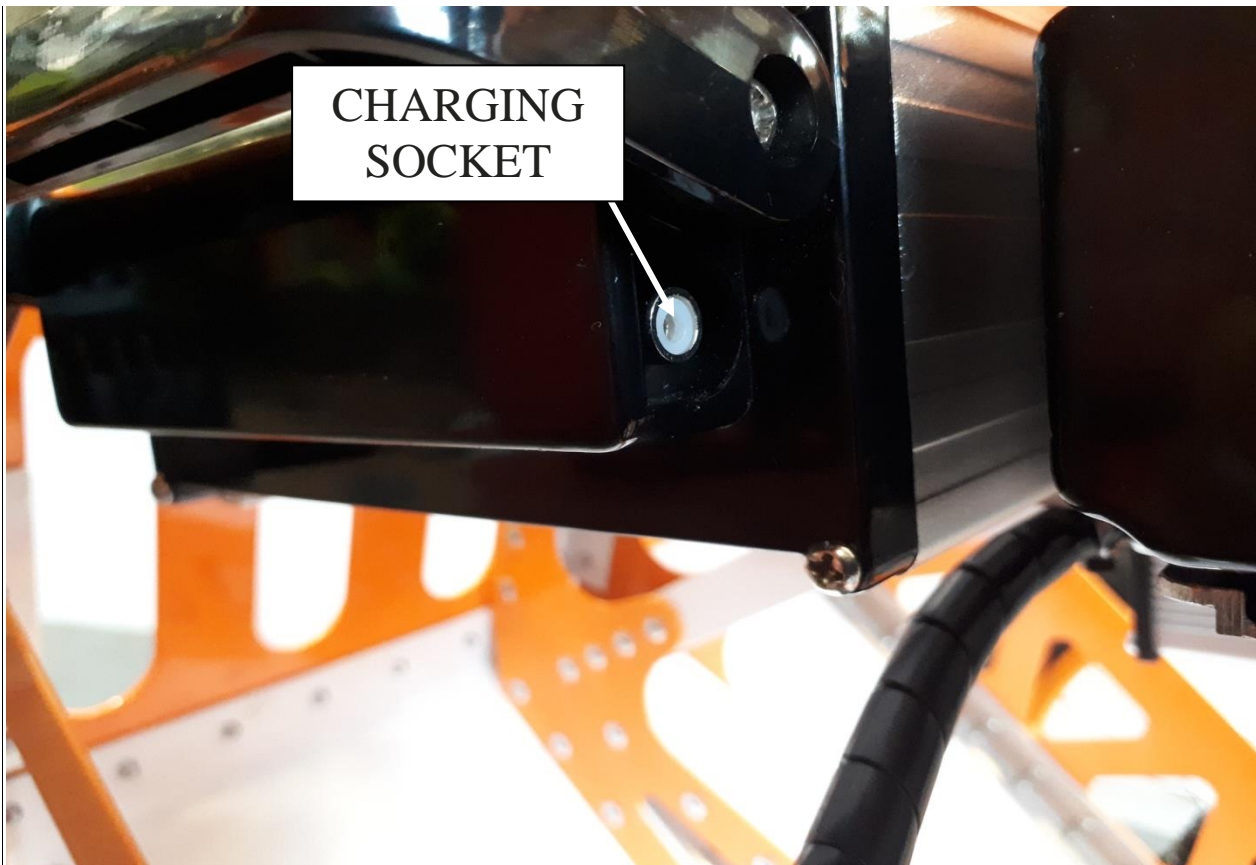
It is forbidden to use a fuse of other parameters. This may cause damage to the electrical system and fire.



Diag. 10 BATTERY



Diag. 11 LOCATION OF THE FUSE



Diag. 12 CHARGING SOCKET

11. Setup

11.1. Seat position

The seat is equipped with a mounting system, with adjustable distance from the footrest and handlebar and regulated degree of the backrest. To change the distance, pull the lever on the front bottom of the seat and adjust distance with your legs or in case of disability with assist of a second person. After setting the distance, the locking mechanism must be released and the seat moved slightly until the bolt is locked. To change the inclination of the backseat, release the two adjustment knobs on the back-bottom of the seat. After adjusting seat secure driver with the seatbelts. Not complying may cause serious body harm or even death in case of accident.



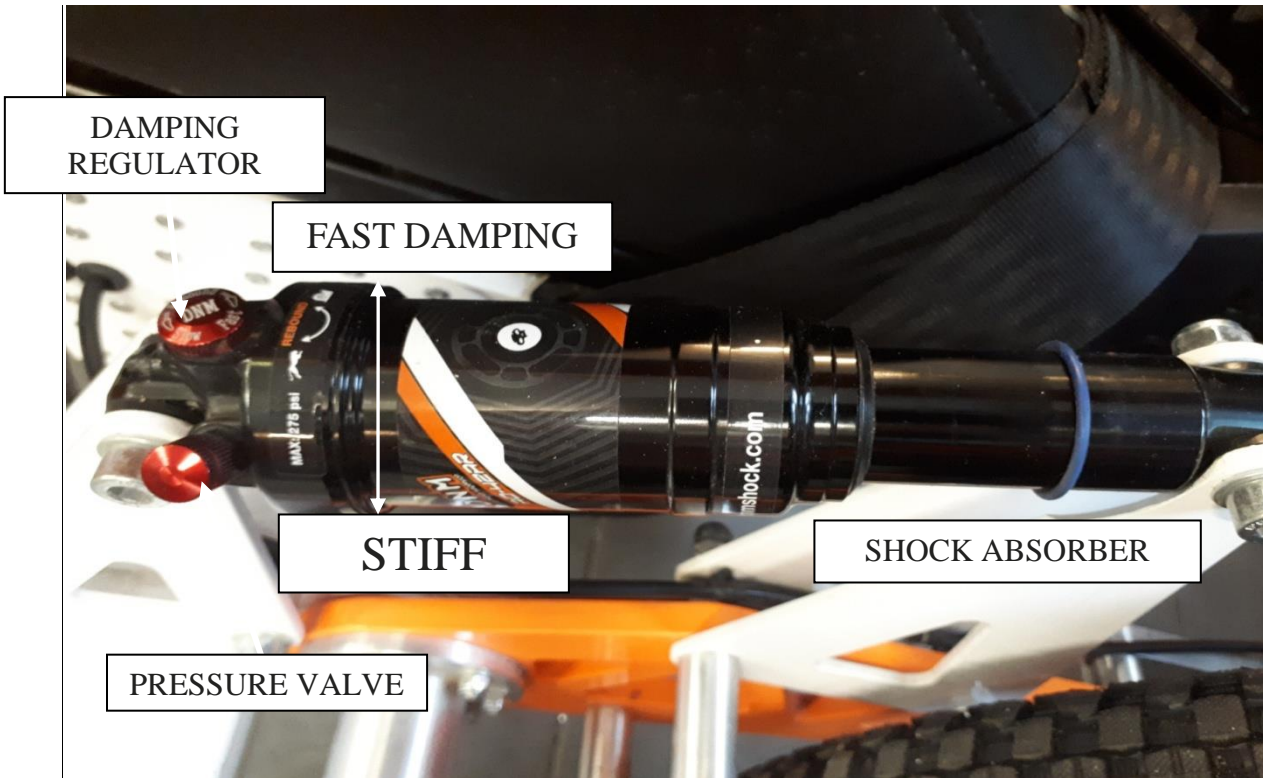
Rys. 13 Seat adjustment

11.2. Braking system

The brake system has two independent front and rear brake circuits. The front wheels stop using the right lever and the rear wheels stop using the left lever. The braking system is very effective, so excessive use of the brake lever can cause the wheel to block and consequently you may fall into a slippage and lose balance. Operate the brake lever with your index finger and middle finger instead of your whole hand. Front wheel locking may cause lack of front steering and cause the vehicle to tip over. Brake levers are equipped with END-STOP'S that turn off engines. During braking regenerative braking is activated (battery charging). Before going full speed, one must practice using the brakes to properly control the vehicle, If squeaking occurs during braking, it has become uneven in individual wheels, brakes have become ineffective, or other disturbing braking problems are observed immediately replace the brake pads.

11.3. Shock absorbers

The hardness of the shock absorbers should be adjusted to the weight of the driver. Excessive deflection of the shock absorber can cause damage to the vehicle and damper and cause discomfort to the driver. The shock absorber must be set as follows: The person who will drive the vehicle must sit on the vehicle with both feet on the ground. The second person at the same time should check the damper's initial deflection, which should be about half of total stroke. For DNM AO-42AR (<http://www.dnmshock.com/products-single.php?id=24>) absorbers with a length of 165 mm the total deflection is 50 mm and the initial deflection (when the driver sits on the vehicle) in the front and rear shock absorbers should be 25 mm. Adjustment of hardness is done by pumping the shock absorber with a pump and dropping pressure is done by venting the valve. Approximate pressure in the front and rear shock absorbers is 7 bars. Maximum pressure cannot exceed 18 bars. Exceeding this pressure can damage the shock absorber. Damper adjustment should be unscrewed towards the softest damping.



Diag. 14 SHOCK ABSORBER CONFIGURATION

12. Maintenance



Please observe the following maintenance recommendations:

- The maintenance and servicing times given in this manual must be strictly observed.
- Any changes have to be approved by the manufacturer.
- To prevent premature wear of EV4, diligently clean and maintain them at regular intervals.
- Correct maintenance ensures that the service life is extended and the level of security remains unchanged.
- Carry out maintenance procedures using personal protective equipment (protective gloves).
- Do not throw waste into the environment as a result of maintenance. Dispose of them in accordance with applicable regulations.
- Some maintenance and repairs require the use of specialized tools and knowledge of how to perform such repairs. Therefore, repairs must be carried out only by the manufacturer or in the place indicated by the manufacturer.
- Most of the parts used to make EV4 are aviation grade. Fabrication of components from other materials will not provide adequate strength and consequently will not ensure proper operation of the vehicle.
- The frame and other parts of the vehicle are riveted with aviation grade rivets. Repairing the vehicle with other rivets than recommended by the manufacturer can reduce the strength of the individual components or damage the vehicle.

12.1. Wheels

The vehicle has 20” spoke wheels and 20” spoke back hub motor wheel. All with aluminium rims. It is very important to maintain proper pressure in the wheels. It should be 2.5-3 all wheels. Too low or too high pressure in the tires can cause

damage to: tires, wheel rims, suspension and cause excessive electricity consumption. It is very important that the tread of the tire is correct and not worn out. Too much tread wear can cause tire breakage, poor vehicle grip and poor tread. Uneven tread wear may indicate wheel distortion, improper centring, suspension failure, incorrect tire pressure, improper tire operation, improper tire assembly, etc. When the tire is punctured or has low pressure it needs to be replaced immediately. Always remove air from the wheel before replacing the tire. The front tires and inner tube can be replaced without removing the wheels. The rear wheel must be removed before the tire can be taken off. Be careful when disassembling the wheel. The cable leading to the motor can easily be damaged during unsuitable dismantling and assembly .

12.2. Bolts and glued parts

All screws used in EV4 are screws with a higher strength class. Replacing them can only take place with screws of adequate strength. The minimum strength class of screws is 8.8. Some screws such as the rocket axles have a strength class of 12.9. Almost all used nuts are self-locking nuts and are one time use only. After unscrewing, replace them with new ones. Some nuts, for example when attaching the rocker arms for safety reasons, are blinded. In screw connections where self-locking nuts are not used for safety, a self-locking safety thread is used: Loctite 243. Loctite 603 is used in some places, such as bearing housings, wheel alignment, and engine rack mounting. Removal and reassembly of these components requires the use of specialized tools, preheating when disassembling and reuse of glue during assembly.

12.3. Vehicle transmission

Direct drive system is responsible for speed control. Vehicle uses direct hub motors. Transmission is electrically controlled.

12.4. Lubrication

Important components requiring lubrication are ball joints in the suspension system and in the steering. The M8, M10 and M12 ball joints are in front suspension. The right lubricant for these is engine or gear oil used in automotive industry. There are a total of 4 M8 joints in the steering system. All of them require periodic lubrication. They should be lubricated every 100-400 km. The period in which the articulations must be lubricated depends on the style of riding, the type of terrain, the mass of the user, the dirt and sanding. If the vehicle is standing unused for more than 2 months then the joints should also be lubricated before using the vehicle after such a break. If the joints become too loose, replace them with new ones, keeping the same length of the pushers when replacing them.

13. Fixing

EV4 repair may only be carried out by specially trained AERO-SERVICE personnel. EV4 repairers must adhere to the factory guidelines. Failure to comply with the recommendations may result in loss of health.



WARNING! Performing such operations requires appropriate technical competence or specific skills so that they can only be performed by qualified personnel with experience gained and recognized in the performance of their activities.

14. Moving EV4

The vehicle can be moved by: front rack, safety bow, rims and handrails. It is forbidden to move the vehicle by grabbing the drive system, suspension, steering. This may cause a hand and body injury and damage to the vehicle. Do not carry the vehicle by the shock absorber, it may damage it.

When transporting EV4 on means of transport, it must be secured with fastening straps so that it cannot be moved. Fixing straps must not be attached to delicate components. Excluded are spokes, hydraulic and electrical wires, controllers, etc.

15. Part specification

If you need to replace vehicle parts, you must contact AERO-SERVICE (tel. +48 603 397 810, e-mail: ev4@ev4.pl) before replacement. AERO-SERVICE will present a suitable replacement model. Using a component that is not approved by AERO-SERVICE may result in an accident. When replacing some spare parts, you must follow the original parts manual. The life span of the entire vehicle provided by the manufacturer is 15 years.

16. Noise

The vehicle in terms of noise emission complies with European standards and directives. The average noise level during operation of the operator at a distance of 1m is $< LpA=70$ dB.

17. Radiation

Components of the vehicle are built in accordance with the requirements of the EMC Directive 2014/30/EU, so that the vehicle does not emit harmful electromagnetic interference and is itself resistant to such interference.

18. Troubleshooting

If the vehicle is not working or does not work properly, do not troubleshoot or repair the vehicle by yourself, return it to the manufacturer or to the person indicated by the manufacturer.

Procedure:

In the event of a breakdown, please contact us by phone +48 603 397 810 or the person / company indicated by the manufacturer. Many simple failures can be repaired by giving instructions over the phone. In the event of a major breakdown that cannot be remotely repaired, the vehicle must be delivered to the place of purchase after prior contact with the manufacturer.

19. Declaration of conformity

EV4

DEKLARACJA ZGODNOŚCI UE

Declaration of conformity

Nr

2017/DC_16393/01

PRODUCENT: AERO-SERVICE Jacek Skopiński
Manufacturer: Ul. Dereniowa 4/69
 02-776 Warszawa
 Poland

Deklarujemy z pełną odpowiedzialnością, że nasz produkt:
We declare with full responsibility, that our product:

NAZWA: EV 4
Name:

MODEL: BIKE, QUAD, CITY QUAD, GREMLIN, SEMI RECUMBENT
Model: MOUNTAIN-CART, MOUNTAIN-BOARD

NUMERY SERYJNE: 001-999
Serial numbers:

ZASTOSOWANIE: EV4 służy do transportu osób.
Application:

Jest zgodny z następującymi dokumentami odniesienia:
Compliance the following documents of reference:

DYREKTYWY: 2006/42/WE
Directives: 2014/30/UE

NORMY: PN-EN ISO 12100:2012
Harmonized standards:


Dokumentacja została stworzona przez: AERO-SERVICE Jacek Skopiński
Documentation was created by: Ul. Dereniowa 4/69, 02-776 Warszawa

Miejsce przechowywania dokumentacji: AERO-SERVICE Jacek Skopiński
Stocking location of documentation: Ul. Dereniowa 4/69, 02-776 Warszawa

Niniejsza deklaracja zgodności wydana zostaje na wyłączną odpowiedzialność producenta.

Warszawa, 25.02.2019

Miejsce, data:
Place, date:


 AERO-SERVICE
 JACEK SKOPIŃSKI
 ul. Dereniowa 4/69, 02-776 Warszawa
 NIP: 521-271-55-68
 Jacek Skopiński, Właściciel
Stanowisko i Podpis osoby upoważnionej:
Signature of authorized person:

NOTES

