



E-BIKES

TRANSLATION OF THE ORIGINAL OPERATING INSTRUCTIONS

EN

Lacuba EVO 45 Sport

G19

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1

About these instructions

Read these operating instructions before commissioning the vehicle to ensure you use all the functions correctly and safely. They are not a substitute for personal training by the supplying specialist dealer. The operating instructions are an integral part of the vehicle. Therefore, if it is re-sold at a later time, they must be handed over to the subsequent owner.

These operating instructions are mainly intended for the vehicle rider and operator, who tend to be non-professionals.



Text passages which are expressly intended for specialist staff (e.g. bicycle mechanics) are clearly marked with a tool symbol.

Staff at all specialist dealers have specialist training and qualifications, and are therefore capable of identifying risks and preventing hazards which may arise during maintenance, servicing and repairs on the vehicle. Information for specialist staff does not require non-professionals to take any action.

1.1

Manufacturer

The vehicle manufacturer is:

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Longericher Straße 2
50739 Köln, Germany

Tel.: +49 221 17959 0
Fax: +49 221 17959 31
E-mail: info@zeg.de
Internet: www.zeg.de

1.2 Laws, standards and directives

These operating instructions comply with the essential requirements from:

- EC Directive No. 168/2013,
- Electromagnetic Compatibility Directive 2014/30/EU,
- EN 82079-1:2012, Preparation of instructions for use – Structuring, content and presentation – Part 1: General principles and detailed requirements and
- EN ISO 17100:2016-05, Translation Services – Requirements for translation service.

1.3 Other valid documents

These operating instructions are only complete in conjunction with the other valid documents. The following document applies for this product:

- Charger operating instructions.

No other information is also applicable. The constantly updated lists of approved accessories and parts are available to specialist dealers.

1.4

For your safety

The vehicle's safety concept comprises four elements:

- rider and/or operator instruction and vehicle maintenance and repair by the specialist dealer,
- the chapter on general safety,
- the warnings in these instructions and
- the safety marking on the type plates.

1.4.1

Instruction, training and customer service

The supplying specialist dealer will provide customer service. Contact details can be found on the back page of these operating instructions and in the data sheet. If you are unable to contact your specialist dealer, you will find other specialist dealers online at www.zeg.de.



The specialist dealer authorised to perform repairs and maintenance work receives regular training.

The rider or the operator of the vehicle will be instructed in person on the vehicle functions when the supplying specialist dealer hands over the vehicle, if not before. This instruction particularly covers the vehicle's electrical functions and correct use of the charger.

Each rider to whom this vehicle is provided must receive instruction on the vehicle's functions. The operating instructions must be submitted to each rider in printed form and must be acknowledged and adhered to.

1.4.2 Basic safety instructions

These operating instructions have a chapter with general safety instructions[▷ *Chapter 2, page 15*]. You can distinguish this chapter as it has a grey background.

1.4.3 Warnings

Hazardous situations and actions are marked with warnings. The warnings in these operating instructions are shown as follows:

SIGNAL WORD

Type and source of the danger

Description of the danger and the consequences.

► Measures

The following pictograms and signal words are used in the operating instructions for warnings and information notices:



Will lead to serious or even fatal injuries if ignored. High-risk hazard.



May lead to serious or even fatal injuries if ignored. Medium-risk hazard.



May lead to minor or moderate injuries. Low-risk hazard.

NOTICE

May lead to material damage if ignored.

Table 1:

Meanings of the signal words

1.4.4 Safety markings

The following safety markings are used on the vehicle's type plates:



General warning



Adhere to the instructions for use

Table 2:

Safety markings on the product

1.5 For your information

1.5.1 Instructions for actions

Instructions for actions are structured in accordance with the following pattern:

- ✓ Requirements (optional)
- ▶ Instruction for action
- ⇒ Result of the action (optional)

1.5.2 Language conventions

The vehicle described in these operating instructions may be equipped with alternative components. The vehicle equipment is defined by the respective type number. If applicable, the notes *alternative equipment* and *alternative version* make reference to the use of alternative components.

Alternative equipment describes additional components which are not necessarily an integral part of every vehicle in these instructions.

Alternative version explains the various variants of components if they differ in use.

The following terms are used for better legibility:

Term	Meaning
Operating instructions	Original operating instructions or translation of the original operating instructions
Vehicle	S pedelec
Motor	Drive motor

The following conventions are used in these operating instructions:

Convention	Use
<i>Italics</i>	Entry in the index
SPACED	Indicators on the <i>display screen</i>
[▷ <i>Example, page numbering</i>]	Cross references
•	Bulleted lists

1.6 Identifying

1.6.1 Operating instructions

The identification number of these operating instructions is made up of the document number, the version number and the release date. It can be found on the cover page and in the footer.

Identification number	MY19B103_1.0_08.01.2019
------------------------------	-------------------------

Table 3: Identification number of the operating instructions

1.6.2 Vehicle

These BULLS operating instructions refer to the *model year* 2019. The production period is from August 2018 to July 2019. They are issued in August 2018.

The operating instructions are a component part of the following vehicles:

Type number	Model	Vehicle type
G19	Lacuba EVO 45 Sport	City and trekking bicycle

Table 4: Vehicle definition by type number, model and vehicle type

2

2.1

Safety

Requirements for the rider

Unless any other statutory requirements apply to the rider, we recommend that riders be at least 15 years old and hold an AM category driver's licence as a minimum.

2.2

Hazards for vulnerable groups

The battery and charger must be kept out of the reach of children.

2.3

Personal protective equipment

Wearing a helmet is compulsory (moped motor cycle helmet). We also recommend that you wear typical, long, close-fitting cycling clothing and sturdy footwear.

2.4

Proper use

The vehicle must only be used in perfect, fully functional condition. National requirements may apply to the vehicle which differ from the standard equipment. The general laws and regulations for the prevention of accidents and environmental protection in the respective country of use must be observed. Proper use also includes all instructions for actions and check lists in these operating instructions. Approved accessories can be installed by specialist staff.



The vehicle is designed for daily, convenient use on asphalted roads and paths. The vehicle is suitable for use in road traffic. For riding on public roads, some special regulations apply in relation to the driving light, reflectors and other components.



1



2

2.5

Area of use:

Suitable for tarmacked and paved roads.

Suitable for tarmacked roads, cycle paths and firm gravel paths and roads, and longer sections with moderate slopes and jumps up to 15 cm.

Improper use

Failure to adhere to the proper use poses a risk of personal injury and material damage. The vehicle is not suitable for the following uses:

- when the electrical drive system has been manipulated
- when the permitted gross load weight is exceeded
- riding with a damaged or incomplete vehicle,
- riding over steps
- riding through deep water
- carrying other people
- riding with excessive or unsecured luggage
- riding with no hands
- riding on ice and snow
- improper servicing
- improper repair
- tough areas of use, such as professional competitions
- stunt riding or acrobatics.



The vehicle is not a sports bicycle. If used for sports, the rider can expect reduced riding stability and diminished comfort. The vehicle is unsuitable for riding on off-road terrain.

Non-permitted areas of use:



1



2

Never drive off-road or perform jumps.

Never drive off-road or perform jumps over 15 cm.

2.6

Duty to take care

Vehicle safety can only be assured if all necessary measures are taken.

2.6.1

Rider

The rider:

- receives instruction before the first ride. They can clarify any questions relating to the operating instructions with the operator or specialist dealer.
- wears personal protective equipment.
- assumes all the operator's obligations if the vehicle is passed on to someone else.

2.6.2

Operator

The operator has the duty of care and responsibility for scheduling these measures and checking that they are implemented.

The operator:

- makes these operating instructions available to the rider for the duration of vehicle usage. If necessary, they translate the operating instructions into a language which the rider understands.
- familiarises the rider with the vehicle's functions before the first ride. Only riders who have received instruction may be allowed to ride.
- instructs the rider on proper use and the wearing of personal protective equipment.
- only employs specialist staff for maintenance and repair of the vehicle.
- ensures that there is no unauthorised access, such as preventing replacement of gear sprockets with parts which are not original parts.

The printed EC Declaration of Conformity in the appendix is valid providing that the vehicle remains unchanged from its original condition. As soon as the operator makes any relevant modifications or additions, they legally become the manufacturer. They must guarantee compliance with the EC directives under their own responsibility once more to:

- bring the vehicle into circulation again,
- attach the CE marking again and
- avoid compromising occupational safety.



3 Description

3.1 Overview

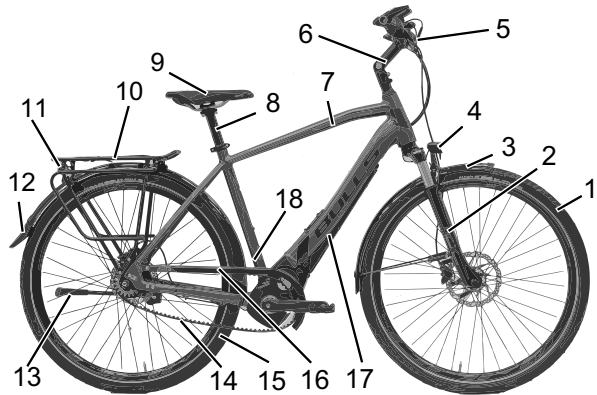


Figure 1: Vehicle on the right – Lacuba Evo 45

- 1 *Front wheel*
- 2 *Fork*
- 3 *Front mudguard*
- 4 *Headlight*
- 5 *Handlebars*
- 6 *Stem*
- 7 *Frame*
- 8 *Seat post*
- 9 *Saddle*
- 10 *Pannier rack*
- 11 *Rear light and reflector*
- 12 *Rear mudguard*
- 13 *Kickstand*
- 14 *Chain*
- 15 *Rear wheel*
- 16 *Chain guard*
- 17 *Battery*
- 18 *Frame number and type plate*

3.2

Handlebars

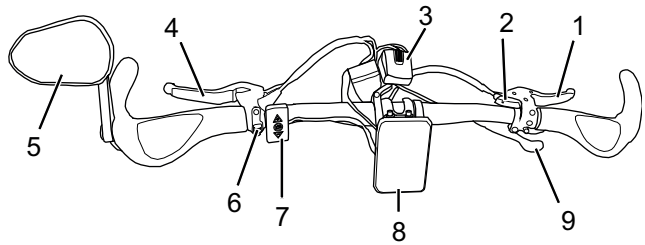


Figure 2:

Detailed view of vehicle from rider position, example

- 1 Front brake lever
- 2 Gear indicator
- 3 Headlight
- 4 Rear brake lever
- 5 Mirror
- 6 Horn
- 7 Operating element
- 8 Display
- 9 Shifter

3.3

Wheel and fork

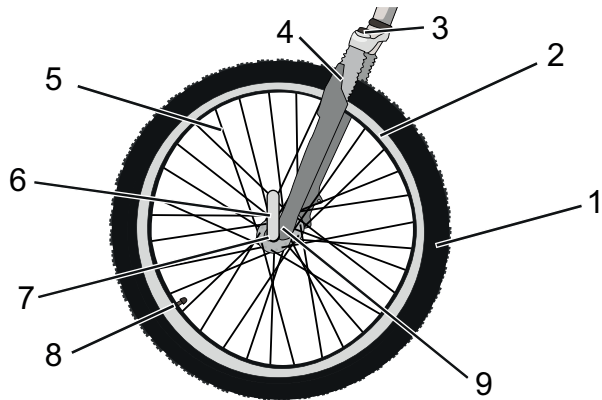


Figure 3:

Components of the wheel – example showing front wheel

- | | |
|---|---|
| 1 | Tyre |
| 2 | Rim |
| 3 | Suspension fork head with setting wheel |
| 4 | Fork |
| 5 | Spoke |
| 6 | Quick release |
| 7 | Hub |
| 8 | Valve |
| 9 | Fork end of the suspension fork |

3.3.1

Valve

Each wheel has a valve. It is used to fill the *tyre* with air. There is a valve cap on each valve. The screw-on valve cap keeps out dust and dirt.

The vehicle either has a classical *Dunlop valve*, a *Presta valve* or a *Schrader valve*.

Dunlop valve



The rider can easily exchange the valve and quickly release the air. The air pressure cannot be measured with this valve.

Presta valve



The Presta valve requires a smaller hole in the rim, which is why it is especially suitable for the narrow rims of racing bicycles. The air pressure can be measured with this valve.

Schrader valve



The rider can fill the Schrader valve very easily at a petrol station. The air pressure can be measured with this valve.

3.4

Brake system

The vehicle's brake system comprises a hydraulic rim brake on both the front and rear wheel.

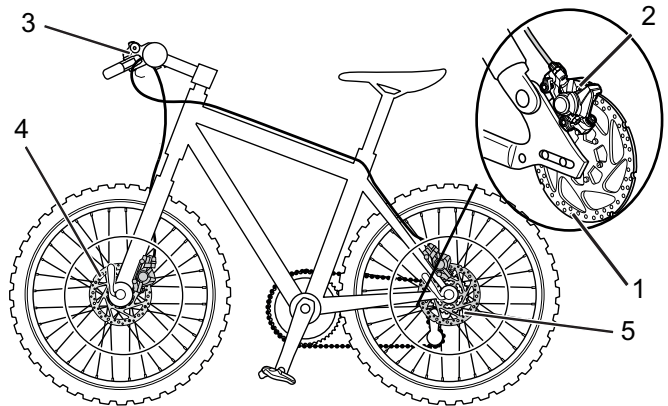


Figure 4: Vehicle brake system with a disc brake, example

- 1 Brake disc
- 2 Brake calliper with brake linings
- 3 *Handlebars with brake levers*
- 4 Front wheel brake disc
- 5 Rear wheel brake disc

The brake disc is screwed permanently to the wheel *hub* on a vehicle with a disc brake.

The brake lever is pressed to increase brake pressure. The brake fluid is used to transfer pressure through the brake lines to the cylinders in the brake calliper. The braking force is boosted by a speed reduction and applied to the brake linings. These apply the brake disc mechanically. If the brake lever is pulled, the brake linings are pressed against the brake disc, and the movement of the wheel is decelerated until it comes to a stop.

3.5 Electric drive system

3.6 Drive system

The vehicle is driven by muscle power applied to the chain drive. The force which is applied by pedalling in the direction of travel, drives the front chain wheel. The chain transmits the force onto the rear chain wheel and then onto the rear wheel.

You can ride the vehicle like a normal vehicle at any time, either by switching off the electric drive system or changing the level of assistance to Off. The same applies when the battery is empty.

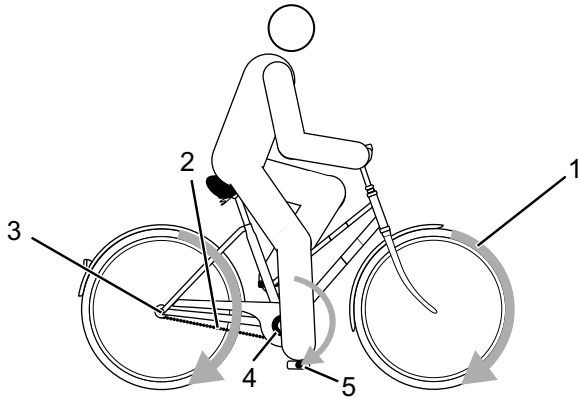


Figure 5: Diagram of drive system

- 1 Direction of travel
- 2 Chain
- 3 Rear chain wheel
- 4 Front chain wheel
- 5 Pedal

The vehicle also has an integrated, electric drive system in addition to its drive system propelled by muscle power. The electric drive system is made up of 8 components:

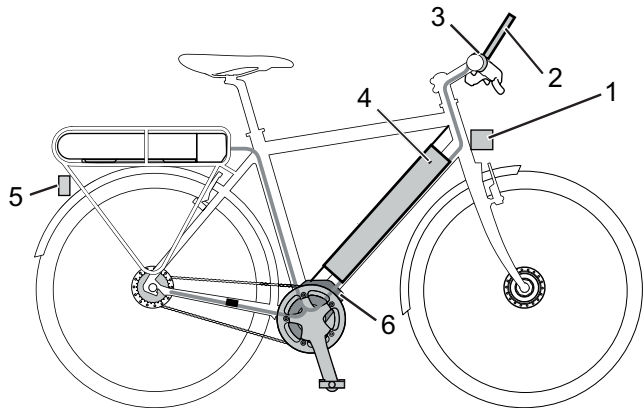


Figure 6:

Diagram of electric drive system

- 1 *Headlight*
 - 2 *Display*
 - 3 *Operating element*
 - 4 Rechargeable battery
 - 5 Rear light
 - 6 Motor
- A charger which is designed for the battery.

As soon as the required muscle power from the rider pedalling passes a certain level, the motor is activated gently and assists the pedalling motion of the rider. The motor force is determined by the set level of assistance. The assistance depends on the force applied to the pedals by the rider. Drive system assistance is therefore only activated when the rider pedals. This happens regardless of the selected level of assistance. The motor switches off automatically as soon as the rider no longer pedals, the temperature is outside the permitted range, there is an overload or the shut-off speed of 25 km/h has been reached.

If the speed falls below 25 km/h, the assistance is automatically activated again.

A push assist system can be activated. The push assist continues to drive the vehicle as long as the rider pushes the plus button on the *handlebars*. The speed can be a maximum of 6 km/h in this case.

3.6.1

Rechargeable battery

The lithium ion battery has an internal electronic protection circuit. It is matched to the charger and the vehicle. The battery temperature is monitored at all times. The battery is protected against deep discharge, overcharging, overheating and short circuit. In the event of a hazard, a protective circuit switches the battery off automatically. The battery also switches to sleep mode for self-protection when not used for a longer period. The battery's service life can be extended if it is well maintained and, above all, stored at the correct temperatures. The battery charge status will decrease with age, even if the battery is maintained properly. If the operating time is severely shortened after charging, this is a sign that battery has reached the end of its useful life.

Transportation temperature	5 °C - 25 °C
Ideal transportation temperature	10 °C - 15 °C
Storage temperature	5 °C - 25 °C
Ideal storage temperature	10 °C - 15 °C
Charging ambient temperature	10 °C - 30 °C

Table 5:

Rechargeable battery technical data

The vehicle has an integrated battery

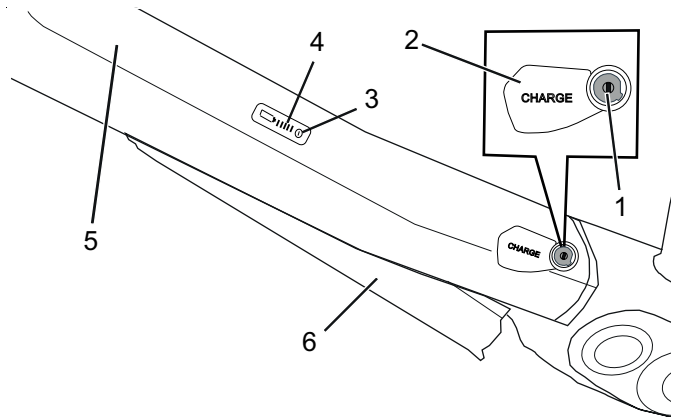


Figure 7: Evo 650 battery details with battery lock (1), port for charger plug (2), On-Off button (3), operating and charge status indicator (4), top of down tube (5) and swung-out battery (6)

The LEDs on the charge status indicator show the battery charge status when the battery is switched on.

3.6.1.1 Range

The range is influenced by many factors, such as:

- level of assistance: the higher the selected level of assistance, the lower the range;
- gear switching habits,
- tyre type,
- tyre pressure,
- the age, condition and charge status of the battery,
- route profile (slopes) and route quality (road surface),
- weather conditions (e.g. opposing winds, ambient temperature, etc.),
- e-bike weight and
- load.

3.6.2**Driving light**

The driving light is automatically switched on when the drive is turned on and cannot be switched off.

The headlight features a sensor, which allows the headlight to distinguish between DAYLIGHT and DARKNESS mode.

DAYLIGHT mode

The complete lamp unit is lit. The driving light is lit in dimmed mode and the extra LEDs for daytime use are activated.

DARKNESS mode

The driving light is lit at full power.

3.6.3**Horn**

The vehicle features an electric horn to signal a warning.

3.6.4**USB port**

The display has a micro USB port on the underside. With a suitable USB cable, you can charge devices such as your mobile. The charging current is 0.5 amps. Please observe the permissible charging currents of your devices.

Charge voltage	5 V
Charging current	max. 500 mA

Table 6:**USB port technical data**

3.6.5

Display

The display shows all ride data. The vehicle's battery powers the display when the display is inserted in the mount, a sufficiently charged battery is inserted into the vehicle and the drive system is switched on.

Internal lithium ion battery	3.7 V, 240 mAh
Storage temperature	5 °C - 25 °C
Charging ambient temperature	10 °C - 30 °C

Table 7:

Display technical data

The *display* has a USB port.



Figure 8:

Display details**Use**

- 1 Screen display
- 2 USB port

Table 8:

Display overview

3.6.5.1

Displays

The *display* has ten on-screen indicators:

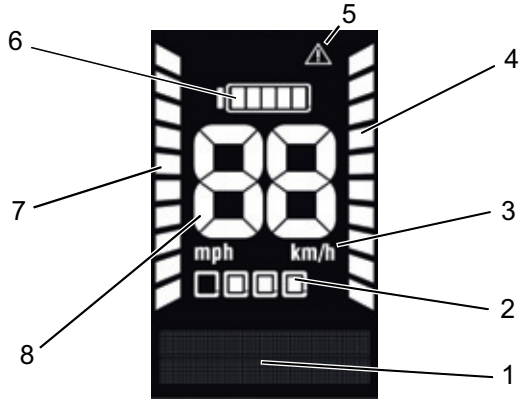


Figure 9:

On-screen indicators overview

Use	
1	Function display
2	Level of assistance
3	Unit of measure for speed
4	Display of rider's power output
5	Warning symbol
6	Driving light symbol
7	Push assist symbol
8	Charge status indicator
9	Motor power output screen
10	Current speed

Table 9:

On-screen indicators overview

Level of assistance

The higher the selected level for assistance, the more the drive system assists the rider when pedalling. The following levels of assistance are available.






Screen display	Level of assistance
	off
	1
	2
	3
	4

Table 10:

Display of levels of assistance

Current speed

In the system settings, you can select whether the speed is displayed in kilometres or miles.

Function display

The function display shows three different items of information:

- Journey information,
- System settings and data, and
- System messages.

Journey information

Depending on the type of vehicle, the function display may show up to eight items of journey information. The displayed journey information can be switched.

Screen display	Function
CLOCK	Current time, displayed in hh:mm
TRIP DISTANCE	Distance travelled since the last reset, displayed in kilometres or miles
TRIP CALORIES	Calories burned since the last reset, displayed in calories
TRIP TIME	Time elapsed since the last reset, displayed in hh:mm
AVG. SPEED	Average speed since the last reset, displayed in kilometres per hour or miles per hour
MAX. SPEED	Maximum speed travelled since the last reset, displayed in kilometres per hour or miles per hour
TOTAL DISTANCE	Total distance travelled, displayed in kilometres or miles
TOTAL TIME	Travelled time, displayed in hh:mm

Table 11:

Journey information

System settings and data

In order to see the system settings, the rider has to call up the system settings. The rider can change the values of the system settings.

Screen display	Function
RESET TRIP	Set trip time, calories burned, distance and average speed to 0
RESET ALL	Set all values incl. total distance and total trip time to 0
DATE	DD/MM/YY
TIME FORMAT	24/12
TIME	hh/mm
LANGUAGE	German/English
METRIC/IMPERIAL	km/mi

Table 12:

Changeable system settings

Charge status indicator

The charge status indicator consists of 5 segments. Every segment shows 20% of the battery charge status.

If the charge status is <20%, the charge status indicator starts to flash. If the charge status is <5%, the charge status indicator disappears. The motor assistance will be switched off in order to ensure that lighting can be used for another two hours.













When charging		When riding	
	0 - 19%		80 - 100%
	20 - 39%		60 - 79%
	40 - 59%		40 - 59%
	60 - 79%		20 - 39%
	80 - 99%		5 - 19%
	100%		< 5 - 0% emergency operation, motor off

Table 13:

Battery charge status indicator

System message

The drive system monitors itself continuously and if an error is detected, it is indicated by a system message. The system may switch off automatically depending on the type of error. There is a table of system messages in the Appendix.

3.6.6

Operating element

The operating element has six buttons.

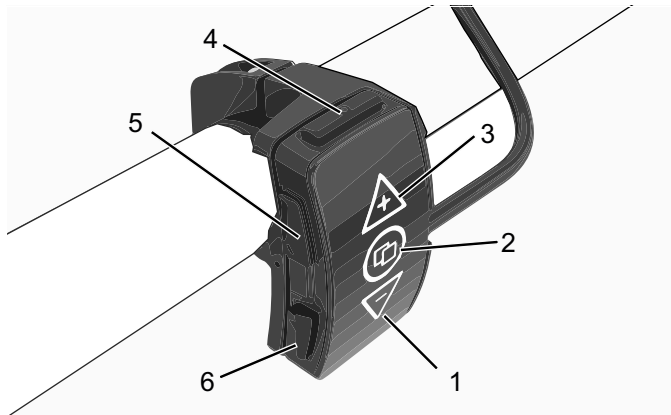


Figure 10:

Operating element overview

	Symbol	Designation
1	–	Minus button
2		Info button
3	+	Plus button
4		On-Off button
5		Button not in use
6		Push assist button

Table 14:

Operating element overview

4 Technical data

Vehicle

Transportation temperature	5 °C - 25 °C
Ideal transportation temperature	10 °C - 15 °C
Storage temperature	5 °C - 25 °C
Ideal storage temperature	10 °C - 15 °C
Operation temperature	5 °C - 35 °C
Working environment temperature	15 °C - 25 °C
Charging temperature	10 °C - 30 °C
Power output/system	250 W (0.25 kW)
Shut-off speed	25 km/h

Table 15:

Vehicle technical data

Motor

Dimensions (mm)	213 x 150 x 128
Weight	3400 g
Nominal voltage	36 V DC
Protection class	IP56
Max. torque	90 Nm
Continuous power rating	250 W
Assistance up to	25 km/h
Working temperature	-10 - +50 °C

Table 16:

Motor technical data

Evo 650 rechargeable battery

Transportation temperature	5 °C - 25 °C
Ideal transportation temperature	10 °C - 15 °C
Storage temperature	5 °C - 25 °C
Ideal storage temperature	10 °C - 15 °C
Charging ambient temperature	10 °C - 30 °C

Table 17:

Rechargeable battery technical data

SuperCore rechargeable battery

Voltage	37 V / 42.0 V
Energy	750 W / 20 Ah
Transportation temperature	5 °C - 25 °C
Ideal transportation temperature	10 °C - 15 °C
Storage temperature	5 °C - 25 °C
Ideal storage temperature	10 °C - 15 °C
Charging ambient temperature	10 °C - 30 °C

Table 18:

Rechargeable battery technical data

Display and control panel

Dimensions (mm)	Display: 44 x 62.5 x 8 Control panel: 18 x 46 x 19.75 Display area: 38 x 50
Weight (g)	Display unit: 67
Nominal voltage	36 V DC
Protection class	IP65
Working temperature	-10 - +60 °C
Storage temperature range	-20 - +85 °C

Table 19:

Operating element technical data

USB port

Charge voltage	5 V
Charging current	max. 500 mA

Table 20:

USB port technical data

Emissions

A-weighted emission sound pressure level	< 70 dB(A)
Total vibration level for the hands and arms	< 2.5 m/s ²
Highest effective value of weighted acceleration for the entire body	< 0.5 m/s ²

Table 21:

Emissions from the vehicle*

*The safety requirements as per Electromagnetic Compatibility Directive 2014/30/EU have been met. The vehicle and charger can be used in residential areas without restriction

Tightening torque

Axle nut tightening torque	35 Nm - 40 Nm
-----------------------------------	---------------

Handlebars clamping screw maximum tightening torque*	5 Nm - 7 Nm
---	-------------

Table 22:

Tightening torque values

***if there is no other data on the component**

5 Transportation, storage and assembly

5.1 Transportation



Crash caused by unintentional activation

There is a risk of injury if the drive system is activated unintentionally.

- ▶ Remove the battery before the vehicle is transported.



Risk of fire and explosion due to high temperatures

Excessively high temperatures will damage the battery. Batteries may self-ignite and explode.

- ▶ Never expose batteries to sustained direct sunlight.



Oil leak if no transport securing device

The brake securing device prevents the brakes from being applied accidentally during transport. This could cause irreparable damage to the brake system or an oil leak, which will harm the environment.

- ▶ Never push the brake lever when the wheel has been dismantled.
- ▶ Always use the transport securing system when transporting dismantled wheels.



NOTICE

If the vehicle is lying flat, oil and grease may leak from the vehicle.

If the shipping box with a vehicle is lying flat or on one end, it does not provide the *frame* and the wheels with adequate protection from damage.

- ▶ Transport the vehicle in an upright position only.
-

NOTICE

Vehicle rack systems which secure the vehicle by its *handlebars* or *frame* in an upside-down position exert inadmissible forces on the components during transportation. This can cause the supporting parts to break.

- ▶ Never use vehicle rack systems which secure the vehicle by its *handlebars* or *frame* in an upside-down position.
-
- ▶ Take into account the ready-to-use vehicle's weight when transporting it.
 - ▶ Remove the *display* and the batteries before transporting the vehicle.
 - ▶ Protect the electrical components and connections on the vehicle from the elements with suitable protective covers.
 - ▶ Remove accessories such as drinking bottles before transporting the vehicle.
 - ▶ You must use a suitable vehicle rack system when transporting by car.



The specialist dealer will advise you on how to select a suitable rack system properly and how to use it safely.

- ▶ Transport the vehicle in a dry, clean place where it is protected from direct sunlight.



When shipping the vehicle, we recommend that you have it partially dismantled and packaged properly by the specialist dealer.

5.1.1 Transporting the battery

Batteries are subject to hazardous goods regulations. Undamaged batteries may be transported by private persons in road traffic. Commercial transport requires compliance with regulations concerning packaging, labelling and the transportation of hazardous goods. Open contacts must be covered and the battery securely packaged. The parcel service must be made aware of the presence of hazardous goods in the packaging.

5.1.2 Using the transport securing system

- ▶ Insert the transport securing devices between the brake linings.
- ⇒ The transport securing device is squeezed between the two linings.

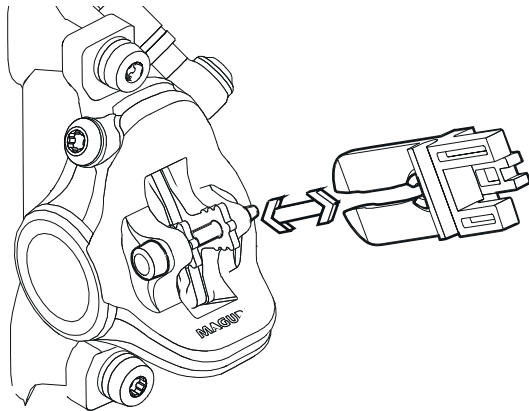


Figure 11: Fastening the transport securing device

5.2

Storing



Risk of fire and explosion due to high temperatures

Excessively high temperatures will damage batteries. Batteries may self-ignite and explode.

- ▶ Protect batteries against heat.
- ▶ Never expose batteries to sustained direct sunlight.



If the vehicle is lying flat, oil and grease may leak from the vehicle.

If the shipping box with a vehicle is lying flat or on one end, it does not provide the *frame* and the wheels with adequate protection from damage.

- ▶ Store the vehicle in an upright position.
-
- ✓ If the vehicle features a hydraulic seat post, fix only the lower seat post or the frame into a fitting stand to prevent damage to the upper seat post and the seat post lever.
 - ✓ Never place a vehicle with a hydraulic seat post upside down on the floor; otherwise you, will damage the seat post lever.
 - ✓ Store the vehicle, battery and charger in a dry, clean location.

Storage temperature	5 °C - 25 °C
Ideal storage temperature	10 °C - 15 °C

Table 23:

Storage temperature for batteries, the vehicle and charger

5.2.1

Break in operation

NOTICE

The battery discharges when not in use. This can cause irreparable damage to the battery.

- ▶ The battery must be recharged every 8 weeks.

NOTICE

The battery may become damaged if it is connected permanently to the charger.

- ▶ Never connect the battery to the charger permanently.

If the vehicle is to be removed from service for longer than four weeks, e.g. in winter, you need to prepare for a break in operation.

5.2.1.1

Preparing a break in operation

- ✓ Enable display storage mode.
- ✓ Remove battery from vehicle.
- ✓ Charge the battery to around 60% (three to four LEDs of the charge status indicator light up).
- ✓ The vehicle needs to be cleaned with a damp cloth and preserved with wax spray. Never wax the friction surfaces of the brake.
- ✓ Before longer periods without use, it is recommendable to have your specialist dealer carry out servicing and basic cleaning and apply preservative agent.

5.2.1.2

Taking out of operation

- ▶ Store the vehicle, battery and charger in a dry, clean environment.
- ▶ Check the charge status of the battery after 8 weeks. If only one LED on the charge status indicator lights up, recharge the battery to around 60%.

5.3

Assembly



Crushing caused by unintentional activation

There is a risk of injury if the drive system is activated unintentionally.

- ▶ Remove the battery if it is not absolutely necessary for assembly.



- ✓ Assemble the vehicle in a clean, dry environment.
- ✓ The working environment temperature should be between 15 °C and 25 °C.

Working environment temperature	15 °C - 25 °C
--	---------------

Table 24:

Working environment temperature

- ✓ If a fitting stand is used, it must be approved for a maximum weight of 30 kg.
- ✓ To reduce weight, we recommend that you always disconnect the battery from the vehicle when using the fitting stand.

5.3.1

Required tools

The following tools are required to assemble the vehicle:

- Knife
- Hexagon socket spanner 2 (2.5 mm, 3, mm 4 mm, 5 mm, 6 mm and 8 mm)
- Torque wrench with working range between 5 and 40 Nm
- Twelve-point square socket T-25
- Ring spanner (8 mm, 9 mm, 10 mm, 13 mm, 14 mm and 15 mm) and
- Cross, flat head and ordinary screwdriver.

5.3.2

Unpacking



Hand injuries caused by cardboard packaging

The shipping carton is closed with metal staples. There is a risk of puncture wounds and cuts when unpacking and crushing the packaging.

- ▶ Wear suitable hand protection.
- ▶ Remove the metal staples with pliers before the shipping carton is opened.

The packaging material consists mainly of cardboard and plastic film.

- ▶ The packaging has to be disposed of in accordance with the regulations of the authorities.

5.3.3

Scope of delivery

The vehicle was completely assembled in the factory for test purposes and then dismantled for transportation.

The vehicle is 95–98% pre-assembled. The scope of delivery includes:

- the pre-assembled vehicle
- the front wheel
- the pedals
- quick release (optional)
- the charger
- the operating instructions.

The battery is supplied separately from the vehicle.

5.3.4

Commissioning



Risk of fire and explosion due to incorrect charger

Batteries which are recharged with an unsuitable charger may become damaged internally. This may result in fire or an explosion.

- ▶ Only ever use the battery with the supplied charger.
- ▶ Mark the supplied charger and these operating instructions clearly to prevent mix-ups – with the vehicle *frame number* or *type number*, for example.

Only trained technical staff should perform initial commissioning of the vehicle since this requires special tools and specialist knowledge.

Experience has shown that a vehicle which has not yet been sold is automatically handed to end users as soon as it appears ready to ride.

- ▶ For this reason, every vehicle must be prepared, so that it is fully ready for use immediately after being assembled.
- ▶ Staff should work through the initial commissioning check list to prepare the vehicle, so that it is ready to ride.

Initial commissioning check list

- | | |
|--------------------------|--|
| <input type="checkbox"/> | Check battery. |
| <input type="checkbox"/> | The battery is partially charged when delivered. Fully charge the battery to ensure full power. |
| <input type="checkbox"/> | Mount the wheels, quick release and pedals. |
| <input type="checkbox"/> | Re-adjust the quick release clamping force if necessary. |
| <input type="checkbox"/> | Thoroughly degrease the brake discs in disc brakes or the brake sides and linings in rim brakes with brake cleaner or spirit. |
| <input type="checkbox"/> | Place handlebars, stem and saddle in the functional position and check they are firmly in place. |
| <input type="checkbox"/> | Check all the components to make sure that they are firmly in place. Check all the settings and the tightening torque on the axle nuts. |
| <input type="checkbox"/> | <p>Check the entire cable harness to make sure that it is routed properly:</p> <ul style="list-style-type: none"> • You must prevent the cable harness from coming into contact with moving parts. • The cable routes must be smooth and free from sharp edges. • Moving parts must not apply any pressure or tension to the cable harness. |
| <input type="checkbox"/> | Check the drive system, the light equipment and the brakes to make sure that they are fully functional and effective. |
| <input type="checkbox"/> | Adjust the headlight. |
| <input type="checkbox"/> | Set the drive system has to the national language and the appropriate system of measurement. |
| <input type="checkbox"/> | Check the software version of the drive system and update it as necessary. |
| <input type="checkbox"/> | Take a test drive to check the brake system, gear shift and the electric drive system. |

5.3.4.1

Checking the battery



Risk of fire and explosion due to faulty battery

The safety electronics on damaged or faulty batteries may fail. The residual voltage can cause a short circuit. Batteries may self-ignite and explode.

- ▶ Never charge a faulty battery.

The battery must be checked before it is charged for the first time.

- ▶ Press the *On-Off button (battery)*.
- ⇒ If none of the LEDs on the operating and charge status indicator light up, the battery may be damaged.
- ⇒ The battery can be charged if at least one of the LEDs on the operating and charge status indicator is fully lit up, but not if all of them are.
- ▶ Once the battery has been charged, insert it into the vehicle.

5.3.4.2**Checking the stem and handlebars****Checking connections**

▶ Stand in front of the vehicle to check whether the handlebars, stem and fork shaft are firmly attached to one another. Clamp the front wheel between your legs. Grasp the handlebar grips. Try to twist the handlebars towards the front wheel.

⇒ The stem must not move or twist.

Firm hold

▶ Place your entire body weight on the handlebars with the quick release lever closed to check that the stem is firmly in place.

⇒ The handlebars shaft must not move downwards in the fork shaft.

▶ If the handlebars shaft should move in the fork shaft, increase the quick release lever tensioning. To do so, turn the knurled nut slightly in a clockwise direction with the quick release lever open.

▶ Close the lever and check the stem is firmly in position.

Checking the headset backlash

- ▶ To check the handlebar headset backlash, close the quick release lever on the stem. Place the fingers of one hand on the upper headset cup, pull the front wheel brake with the other hand and try to push the vehicle backwards and forwards.
- ▶ The headset cup halves must not move towards one another while you are doing this. Note that there may be noticeable backlash due to worn-out bearing bushes or brake lining backlash in suspension forks and disc brakes.
- ▶ If there is headset backlash in the steering headset, you must adjust it as soon as possible; otherwise, the headset will become damaged. You must make the adjustment as described in the stem manual.

5.3.5

Selling the vehicle

- ▶ Fill out the data sheet on the first page of the operating instructions.
- ▶ Adjust the vehicle to the rider.
- ▶ Set the *stand* and the *shifter*, and show the purchaser the settings.
- ▶ Instruct the operator or rider on how to use all the vehicle's functions.

6 Before the first ride



Crash caused by incorrectly adjusted torques

If a screw is fastened too tightly, it may break. If a screw is not fastened enough, it may loosen. This will cause a crash with injuries.

- ▶ Always observe the indicated torques on the screw or in the operating instructions.

Only a correctly adjusted vehicle will guarantee you the desired ride comfort and health-promoting activity. Therefore adjust the *saddle*, the *handlebars* and the *suspension* to your body and your preferred riding style before the first ride.

6.1 Adjusting the saddle

6.1.1 Adjusting the saddle tilt

The saddle tilt must be adjusted to the seat height, the saddle and handlebar position, and the saddle shape to ensure an optimum fit. The seating position can be optimised in this way if needed. First, readjust the saddle after finding the handlebar position you prefer.

- ⇒ Place the saddle tilt in the horizontal position to adjust the vehicle to your needs for the first time.

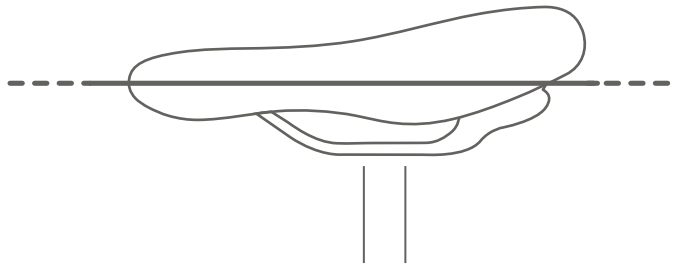


Figure 12: Horizontal saddle tilt

6.1.2

Determining the seat height

- ✓ To determine the seat height safely, either push the vehicle near to a wall, so that you can lean on the wall to support yourself or ask another person to hold the vehicle for you.
- ▶ Climb onto the vehicle.
- ▶ Place your heel on the pedal and extend your leg, so that the pedal is at the lowest crank rotation point.
- ⇒ The rider sits straight on the saddle if the seat is at an optimum height. If this is not the case, you can adjust the length of the seat post to your needs.

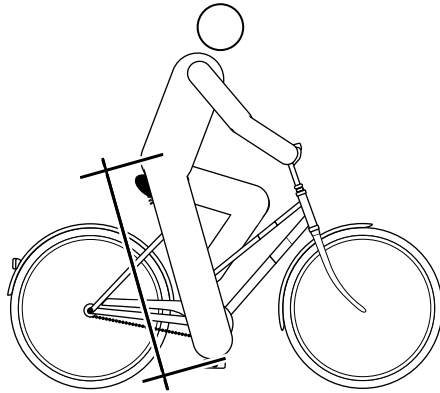


Figure 13:

Optimal saddle height

6.1.3

Adjusting the seat height with quick release

- ▶ Open the quick release on the seat post to change the seat height. To do so, push the clamping lever away from the seat post.

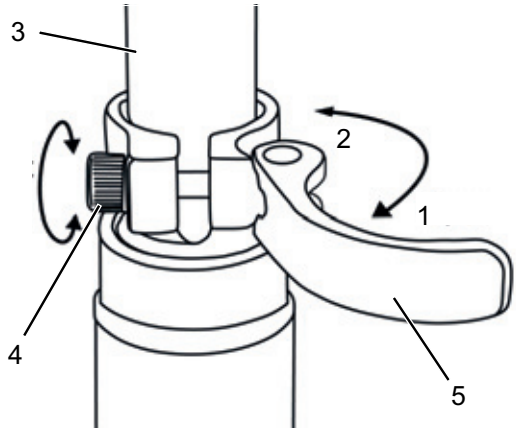


Figure 14:

Seat post quick release (3) with clamping lever (5) and setting bolt (4) in the open position (1) and in the direction of the closed position (2)

- ▶ Set the seat post at the required height.

**CAUTION****Crash caused by an excessively high seat post setting**

A *seat post* with is set too high will cause the *seat post* or the *frame* to break. This will cause a crash with injuries.

- ▶ Do not pull the seat post out of the frame beyond the minimum insertion depth marking.

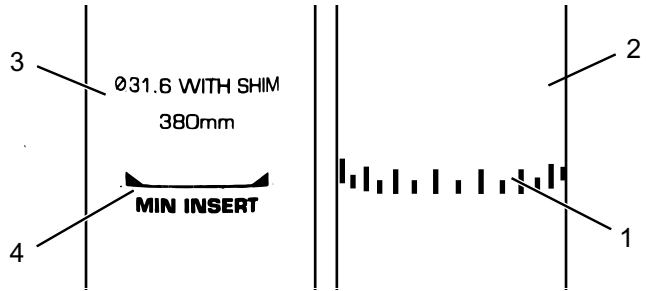


Figure 15: Detailed view of the seat post – examples of the minimum insertion depth marking

- ▶ To close it, push the *seat post clamping lever* as far as it will go into the *seat post*.
- ▶ Checking the *clamping force of quick releases*.

6.1.4 Setting the height-adjustable seat post

- ▶ When using your seat post for the first time, you must give it a firm push downwards to set it in motion. This is due to the natural tendency of the seal to repel oil from the seal surface. You only need to do this before the first use or after a longer period of non-use. Once you have displaced the post through its deflection, the oil spreads on the seal and the post begins to function normally.

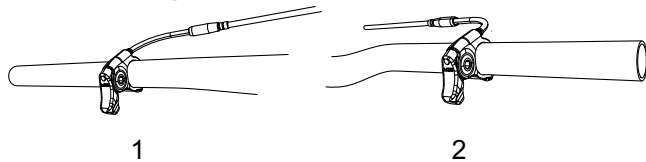


Figure 16: The seat post activation lever can be mounted either on the left (1) or the right (2) side of the handlebars

6.1.4.1**Lowering the saddle**

- ✓ To lower the saddle, press your hand down on the saddle or sit on the saddle.
- ▶ Press the seat post activation lever and hold it down.
- ▶ Release the lever once you have reached the required height.

6.1.4.2**Raising the saddle**

- ▶ Pull the seat post activation level.
- ▶ Remove any pressure on the saddle and release the lever once you have reached the required height.

6.1.5**Adjusting the seat position**

The saddle can be shifted on the saddle frame. The right horizontal position ensures an optimal leverage position for legs. This prevents knee pain and painful incorrect pelvis positions. If you have displaced the saddle more than 10 mm, you then need to adjust the saddle height again since both settings affect one another.

- ✓ To adjust the seat position safely, either push the vehicle near to a wall, so that you can lean on the wall to support yourself or ask another person to hold the vehicle for you.
- ▶ Climb onto the vehicle.
- ▶ Place the pedals into the vertical position (3 o'clock position) with your feet.

⇒ The rider is sitting in the optimal sitting position if the knee cap perpendicular line runs through the pedal axle. If the perpendicular line crosses behind the pedal, bring the saddle forward. If the perpendicular line crosses in front of the pedal, bring the saddle back. Move the saddle within its permitted displacement range only (marked on the saddle stay).

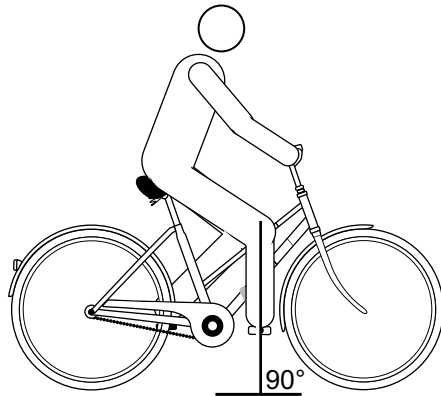


Figure 17: Knee cap perpendicular line

6.2

Adjusting the handlebars



- ✓ The handlebars must only be adjusted while the vehicle is stationary.
- ▶ Unfasten and adjust the designated screw connections, and clamp them with the maximum tightening torque for the clamping screws of the handlebars.

Maximum tightening torque for the clamping screws of the handlebars*

5 Nm - 7 Nm

*if there is no other data on the component

Table 25: Handlebars clamping screw maximum tightening torque

Adjusting the stem

**CAUTION**

Crash caused by loose stem

Incorrectly fastened screws may come loose due to impact. The stem may no longer be firmly fixed in its position as a result. This will cause a crash with injuries.

- ▶ Check the handlebars and the quick release system are firmly in position after the first two hours of riding.
-

6.2.1

Adjusting the handlebar height

**CAUTION**

Crash caused by incorrectly set clamping force

Excessively high clamping force will damage the quick release and cause it to lose its function. Insufficient clamping force will cause a detrimental transmission of force. This can cause components to break. This will cause a crash with injuries.

- ▶ Never fasten a quick release using a tool (e.g. hammer or pliers).
 - ▶ Only use the clamping lever with the specified set clamping force.
-
- ▶ Open the clamping lever.
 - ▶ Pull the locking lever on the stem up, and simultaneously pivot the handlebars into the desired position.
- ⇒ You feel the locking lever click into place.
- ▶ Pull out the handlebars to the required height.
 - ▶ Lock the quick release.

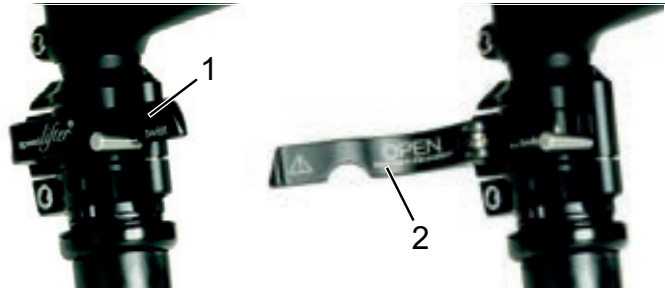


Figure 18: Open (2) and closed (1) clamping lever on the stem; by.schulz speedlifter used as an example

6.2.2 Turning the handlebars to the side *Alternative*



Crash caused by incorrectly set clamping force

Excessively high clamping force will damage the quick release and cause it to lose its function.

Insufficient clamping force will cause a detrimental transmission of force. This will cause a crash with injuries.

- ▶ Never fasten a quick release using a tool (e.g. hammer or pliers).
 - ▶ Only use the clamping lever with the specified set clamping force.
-
- ▶ Open the clamping lever.
 - ▶ Pull the locking lever on the stem up, and simultaneously pivot the handlebars into the desired position.
- ⇒ You feel the locking lever click into place.
- ▶ Pull out the handlebars to the required height.
 - ▶ Lock the quick release.

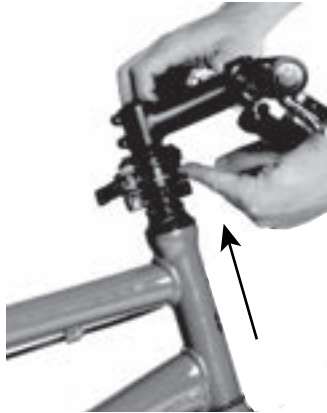


Figure 19: Pushing locking lever upwards - by.schulz speedlifter used as an example

6.2.2.1 Checking the clamping force of the quick releases

- ▶ Open and close the quick releases on the stem or the seat post.
- ⇒ The clamping force is sufficient if the clamping lever can be moved easily from the open final position into the middle and has to be pressed with the fingers or base of the thumb from the middle point onwards.

6.2.2.2 Adjusting the quick release clamping force

- ▶ If the *clamping lever on the handlebars* cannot be moved into its final position, screw out the *knurled nut*.
- ▶ Tighten the *knurled nut* on the seat post if the *clamping lever's* clamping force is not sufficient.



If you are unable to set the clamping force, the specialist dealer will need to check the quick release.

6.3 Adjusting the brake lever

6.3.1 Adjusting the pressure point on a Magura brake lever



WARNING

Brake failure due to incorrect setting

If the pressure point is set with brakes where the brake lining and brake disc have reached their wear limit, the brakes may fail and cause an accident with injury.

- ▶ Before you set the pressure point, ensure that the brake lining and brake disc have not reached their wear limit.

The pressure point setting is adjusted using the twist knob.

- ▶ Turn the twist knob towards the plus (+) symbol.
 - ⇒ The brake lever moves closer to the handlebar grip. Re-adjust the grip distance as necessary.
 - ⇒ The lever pressure point activates sooner.

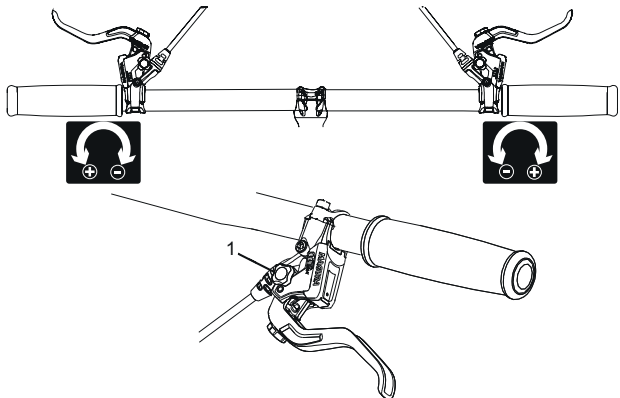


Figure 20: Using the twist knob (1) to adjust the pressure point

6.3.2

Adjusting the grip distance



Crash caused by incorrectly set grip distance

If brake cylinders are set incorrectly or installed wrongly, the braking power may be lost at any time. This may cause a crash with injuries.

- ▶ Once the grip distance has been set, check the position of the brake cylinder and adjust it as necessary.
- ▶ Never correct the brake cylinder position without special tools. Have a specialist dealer correct it.



The brake lever grip distance can be adjusted to ensure that it can be reached more easily. Contact your specialist dealer if the brake handle is too far from the handlebars or is hard to use.

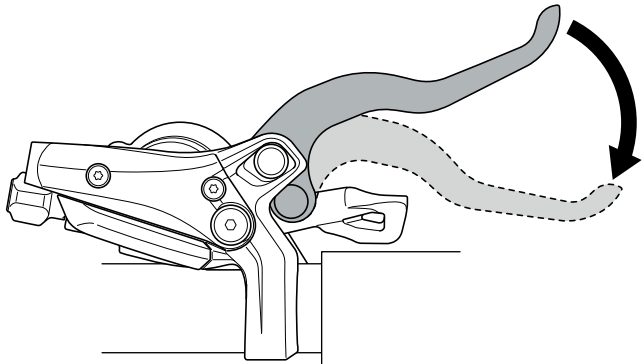


Figure 21:

Brake lever grip distance

6.3.2.1

Adjusting the grip distance on a Magura brake lever *Alternative*

Use a T25 TORX® wrench to turn the setting screw to adjust the grip distance.

- ▶ Turn the setting screw in the minus (–) direction.
⇒ The brake lever moves closer to the handlebar grip.
- ▶ Turn the setting screw in the plus (+) direction.
⇒ The brake lever moves away from the handlebar grip.

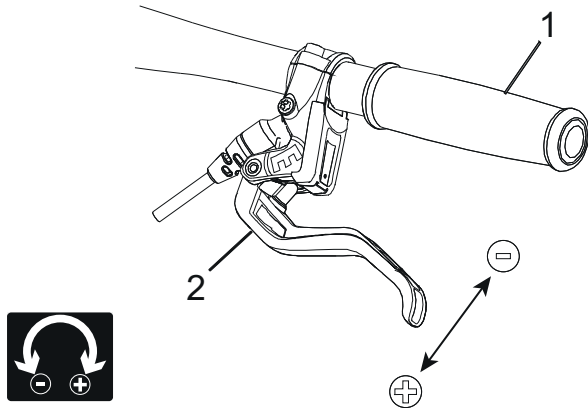


Figure 22:

Using the setting screw (2) to adjust the distance from the brake lever to the handlebar grip (1)

6.4

Adjusting the suspension



CAUTION

Crash caused by incorrectly set suspension

If the suspension is adjusted incorrectly, the fork may become damaged, so that problems may occur when steering. This will cause a crash with injuries.

- ▶ Never ride the vehicle without air in the air suspension fork.
- ▶ Never use the vehicle without adjusting the suspension fork to the rider's weight.

NOTICE

- ▶ Settings on the chassis change riding performance significantly. You need to get used to the vehicle and break it in to prevent accidents.

The adjustment shown here represents a basic setting. The rider should change the basic setting to suit the surface and his/her preferences.

- ▶ It is advisable to make a note of the basic setting. This way, it can be used as the starting point for subsequent, optimised settings and to safeguard against unintentional changes.

6.5

Retracting brake linings

New brake linings take time to break in and adjust to their final braking force.

- ▶ Accelerate vehicle to about 25 km/h.
- ▶ Brake vehicle until it comes to a halt.
- ▶ Repeat process 30–50 times.
- ▶ The brake linings and brake discs are now retracted and provide optimal braking power.

7

Operation



Crash caused by loose clothing

Laces, scarves and other loose items may become entangled in the spokes on the *wheels* and the *chain drive*. This may cause a crash with injuries.

- ▶ Wear sturdy footwear and close-fitting clothing.
-



Risk of fire and burning due to hot motor

The motor housing becomes hot when riding. Touching it may cause burns to the skin or other objects.

- ▶ Never touch the motor housing directly after riding.
 - ▶ Never place the vehicle on a flammable surface, such as grass or wood, directly after use.
-



Crash caused by soiling

Heavy soiling can impair the functions of the vehicle, for example, the function of the brakes. This may cause a crash with injuries.

- ▶ Remove coarse soiling before riding.
-



Crash caused by poor road conditions

Loose objects, such as branches and twigs, may become caught in the wheels and cause a crash with injuries.

- ▶ Be aware of the road conditions.
 - ▶ Ride slowly and brake in good time.
-



When riding downhill, high speeds may be reached. The vehicle is only engineered for exceeding a speed of 25 km/h briefly. In particular the *tyres* can fail if exposed to a continuous load.

- ▶ Decelerate the vehicle with the brakes if higher speeds than 25 km/h are reached.
-

NOTICE

Heat or direct sunlight can cause the *tyre pressure* to increase above the permitted maximum pressure. This can destroy the *tyres*.

- ▶ Never park the vehicle in the sun.
- ▶ On hot days, regularly check the *tyre pressure* and adjust it as necessary.

You can be ride the vehicle within a temperature range between 5 °C and 35 °C. The effectiveness of the drive system is restricted outside of this temperature range.

Operation temperature

5 °C - 35 °C

Moisture penetrating at low temperatures may impair individual vehicle functions due to the open structural design.

- ▶ Always keep the vehicle dry and free from frost.
- ▶ If the vehicle is to be used at temperatures below 3 °C, the specialist dealer must carry out an inspection and prepare the vehicle for winter usage first.



Off-road riding subjects the joints in the arms to severe strain. Take a break from riding every 30 to 90 minutes, depending on the condition of the roads.

7.1

Before each ride



Crash caused by difficult-to-spot damage

If the vehicle topples over or you have a fall or an accident, there may be difficult-to-spot damage to components such as the brake system, quick releases or *frame*. This may cause a crash with injuries.

- ▶ Take the vehicle out of service and have a specialist dealer carry out an inspection.
-



Crash caused by material fatigue

Intensive use can cause material fatigue. A component may suddenly fail in case of material fatigue. This may cause a crash with injuries.

- ▶ Remove the vehicle from service immediately if there are any signs of material fatigue. Have the specialist dealer check the state.
- ▶ Have the specialist dealer carry out a basic inspection regularly. During the inspection, the specialist dealer inspects the vehicle for any signs of material fatigue on the frame, fork, suspension element mountings (if there are any) and components made of composite materials.

Carbon becomes brittle when exposed to heat radiation such as heating. This can cause the carbon part to break and result in a crash with injuries.

- ▶ Never expose carbon parts on the vehicle to strong heat sources.
-

7.2

Check list before each ride

► Check the vehicle before each ride.

⇒ Do not use the vehicle if there are any anomalies.

<input type="checkbox"/>	Check that the vehicle is complete.
<input type="checkbox"/>	Check that the lighting, reflector and brake, for instance, are sufficiently clean.
<input type="checkbox"/>	Check that the mudguards, the pannier rack and the chain guard are securely installed.
<input type="checkbox"/>	Check that the front and rear wheels run true. This is particularly important if the vehicle has been transported or secured with a lock.
<input type="checkbox"/>	Check the valves and the tyre pressure. Adjust as necessary before each ride.
<input type="checkbox"/>	If the vehicle has a hydraulic rim brake, check whether the locking levers are fully closed in their final positions.
<input type="checkbox"/>	Check the front and rear wheel brakes to make sure that they are working properly. To do so, push the brake levers while stationary to check whether resistance is generated in the usual brake lever position. The brake must not lose any brake fluid.
<input type="checkbox"/>	Check that the driving light is working.
<input type="checkbox"/>	Check for unusual noises, vibrations, smells, staining, deformation, cracks, scores, abrasion and wear. This indicates material fatigue.
<input type="checkbox"/>	Inspect suspension system for cracks, dents, bumps, parts or leaking oil. Look at concealed sections on the vehicle's lower surfaces.
<input type="checkbox"/>	Use body weight to compress suspension system. Adjust to the optimum "SAG" value if suspension is too soft.
<input type="checkbox"/>	If quick releases are used check them to make sure that they are fully closed in their end position. If quick release axle systems are used, make sure that all attachment screws are tightened to the correct torque.
<input type="checkbox"/>	Be alert to any unusual operating sensations when braking, pedalling or steering.

7.3

Using the kickstand



CAUTION

Crash caused by a lowered kickstand

The kickstand does not fold up automatically. There is a risk of crashing if riding with the kickstand lowered.

- ▶ Raise the kickstand completely before the ride.
-

NOTICE

The heavy weight of the vehicle may cause the kickstand to sink into soft ground and the vehicle may topple and fall over.

- ▶ The vehicle must be parked on level, firm ground only.
 - ▶ It is particularly important to check stability if the vehicle is equipped with accessories or loaded with luggage.
-

Raising the kickstand

- ▶ Before the ride, raise the kickstand completely with your foot.

Parking the vehicle

- ▶ Before parking, lower the kickstand completely with your foot.
- ▶ Park the vehicle carefully and check that it is stable.

7.4

Using the pannier rack

**CAUTION****Crash caused by loaded pannier rack**

The vehicle riding performance changes with a loaded *pannier rack*, in particular when steering and braking. This can lead to a loss of control. This may cause a crash with injuries.

- ▶ You should practice how to use a loaded *pannier rack* safely and reliably before using the vehicle in public spaces.

**CAUTION****Crash caused by unsecured luggage**

Loose or unsecured objects on the *pannier rack*, e.g. belts, may become caught in the rear wheel. This may cause a crash with injuries.

Objects which are fastened to the *pannier rack* may cover the vehicle's *reflectors* and the *driving light*. The vehicle may not be seen by other users on public roads as a result. This may cause a crash with injuries.

- ▶ Secure any objects which are attached to the *pannier rack* sufficiently.
- ▶ Objects fastened to the *pannier rack* must never cover the *reflectors*, the *headlight* or the *rear light*.

**CAUTION****Crushing the fingers in the spring flap**

The spring flap on the *pannier rack* operates with a high clamping force. There is a risk of crushing the fingers.

- ▶ Never allow the spring flap to snap shut in an uncontrolled manner.
 - ▶ Be careful where you position your fingers when closing the spring flap.
-

NOTICE

The maximum load bearing capacity is indicated on the *pannier rack*.

- ▶ Never exceed the permitted *total weight* when packing the vehicle.
 - ▶ Never exceed the maximum load bearing capacity of the *pannier rack*.
 - ▶ Never modify the *pannier rack*.
-
- ▶ Distribute the luggage as evenly as possible on the left- and right-hand side of the vehicle.
 - ▶ We recommend the use of panniers and luggage baskets.

7.5

Rechargeable battery



Risk of fire and explosion due to faulty battery

The safety electronics on a damaged or faulty battery may fail. The residual voltage can cause a short circuit. The battery may self-ignite and explode.

- ▶ Remove batteries with external damage from service immediately and never charge them.
- ▶ If the battery becomes deformed or begins to smoke, keep at a safe distance, disconnect the power supply at the socket, and notify the fire service immediately.
- ▶ Never extinguish a damaged battery with water or allow it to come into contact with water.
- ▶ If a battery is dropped or struck but shows no signs of external damage, remove it from service and observe it for at least 24 hours.
- ▶ Faulty batteries are hazardous goods. Dispose of faulty batteries properly and as quickly as possible.
- ▶ Store in a dry place until disposal. Never store in the vicinity of flammable substances.
- ▶ Never open or repair the battery.



Chemical burns to the skin and eyes caused by faulty battery

Liquids and vapours may leak from a damaged or faulty battery. They can irritate the airways and cause burns.

- ▶ Avoid contact with leaked liquids.
 - ▶ Immediately consult a doctor in case of contact with the eyes or any discomfort.
 - ▶ In case of contact with the skin, rinse off immediately with water.
 - ▶ Ventilate the room well.
-



Risk of fire and explosion due to high temperatures

Excessively high temperatures will damage the battery. The battery may self-ignite and explode.

- ▶ Never expose the battery to sustained direct sunlight.



Risk of fire and explosion due to short circuit

Small metal objects may jumper the electrical connections of the battery. The battery may self-ignite and explode.

- ▶ Keep paper clips, screws, coins, keys and other small parts away and do not insert them into the battery.



Risk of fire and explosion due to penetration by water

The battery is only protected from simple spray water. Penetration by water can cause a short circuit. The battery may self-ignite and explode.

- ▶ Never immerse the battery in water.
- ▶ If there is reason to believe that water may have entered into the battery, the battery must be removed from service.

NOTICE

If a key is left inserted when transporting the vehicle, or when riding, it may break off or the compartment may open accidentally.

- ▶ Remove the key from the battery lock immediately after use.
- ▶ We recommend that you attach the key to a key ring.

-
- ✓ Switch off the battery and the drive system before removing or inserting the battery.

7.5.1

Removing the battery

- ▶ Open the battery lock with the key.
- ⇒ The battery is released and falls into the retainer guard.
- ▶ Hold the battery in your hand from below. Use the other hand to push on the retainer guard from above.
- ⇒ The battery is released and falls into the hand.
- ▶ Remove the battery from the frame.
- ▶ Remove the key from the lock.

7.5.2

Inserting the battery

- ▶ Place the battery with the contacts first into the lower mount.
- ▶ Flip the battery up so that it is held by the retainer guard.
- ▶ Push the battery upwards so that it audibly clicks into place.
- ▶ Check the battery to make sure it is firmly in place.
- ▶ Lock the battery with the key. Otherwise the battery may fall out of the mount when you open the lock.
- ▶ Remove the key from the lock.

7.5.3

Charging the battery



Fire caused by overheated charger

The charger heats up when charging the battery. In case of insufficient cooling, this can result in fire or burns to the hands.

- ▶ Never use the charger on a highly flammable surface (e.g. paper, carpet etc.).
 - ▶ Never cover the charger during the charging process.
-



Electric shock caused by penetration by water

If water penetrates into the charger, there is a risk of electric shock.

- ▶ Never charge the battery outdoors.
-



Electric shock in case of damage

Damaged chargers, cables and plug connectors increase the risk of electric shock.

- ▶ Check the charger, cable and plug connector before each use. Never use a damaged charger.
-



Risk of fire and explosion due to damaged battery

The safety electronics on a damaged or faulty battery may fail. The residual voltage can cause a short circuit. The battery may self-ignite and explode.

- ▶ If the battery becomes deformed or begins to smoke, keep at a safe distance, disconnect the power supply at the socket, and notify the fire service immediately.
 - ▶ Never extinguish a damaged battery with water or allow it to come into contact with water.
-



If an error occurs during the charging process, a system message is displayed. Remove the charger and battery from operation immediately and follow the instructions.

- ▶ The ambient temperature during the charging process must be within the range from 10 °C to 30 °C.

Charging temperature	10 °C - 30 °C
-----------------------------	---------------

- ✓ The battery can remain on the vehicle or can be removed for charging.
- ✓ Interrupting the charging process does not damage the battery.
- ▶ Remove the rubber cover from the battery.
- ▶ Connect the mains plug of the charger to a normal domestic, grounded socket.

Connection data	230 V, 50 Hz
------------------------	--------------

- ▶ Connect the charging cable to the battery's charging port.
- ⇒ The charging process starts automatically.
- ⇒ During the charging process the operating and charge status indicator indicates the charge status. When the drive system is switched on, the *display* shows the charging process.
- ⇒ The charging process is complete when the LEDs of the operating and charge status indicator go out.

7.5.4

Waking the battery

- ✓ When not used for a longer period, the battery switches to sleep mode for self-protection. The LEDs of the operating and charge status indicator do not light up.
- ▶ Press the *On-Off button (battery)*.
- ▶ The battery's operating and charge status indicator indicates the charge status.

7.6 Electric drive system

7.6.1 Switching on the drive system



Crash caused by lack of readiness for braking

When it is switched on, the drive system can be activated by the application of force on the pedals. There is a risk of a crash if the drive is activated unintentionally, and the brake is not reached.

▶ Never start the electric drive system, or switch it off immediately, if the brake cannot be reached safely and reliably.

✓ A sufficiently charged battery has been inserted into the vehicle.

✓ The battery is firmly positioned. The key has been removed.

▶ Press the **On-Off button (battery)**.

⇒ If the drive system is switched on, the drive is activated as soon as the pedals are moved with sufficient force.

7.6.2 Activating the standby mode

If the vehicle is not moved, the display unit and motor will switch to standby mode. This can also be activated manually. As soon as you move the vehicle again, the display and motor are re-activated and the electric drive system is available once more. After two hours in standby, the battery will switch to deep sleep mode.

If you wish to switch your e-bike off for a short time, you can switch it to standby as follows:

▶ Briefly press the **On-Off button (operating element)**.

⇒ The battery remains in standby mode for 2 hours.

7.6.3

Switching off the drive system

The system switches off automatically ten minutes after the last command. The following options are available to manually switch off the drive system:

- ▶ Press the **On-Off button (operating element)** for >3 sec.

or

- ▶ Press the **On-Off button (battery)** for >3 sec.

⇒ The display, operating element, motor and battery will be switched off completely.

7.7 Control panel with display

7.7.1 Removing and attaching the display

NOTICE

If the rider is not present, the *display* can be used without authorisation, e.g. it may be stolen, the system settings may be changed or journey information may be read.

- ▶ Remove the *display* when the vehicle is parked.
-

Attaching the display

- ▶ Place the *display* tilted to the left on the *mount*.
- ▶ Turn the *display* 45° clockwise.
- ▶ Connect the display to the motor via the intermediate cable.

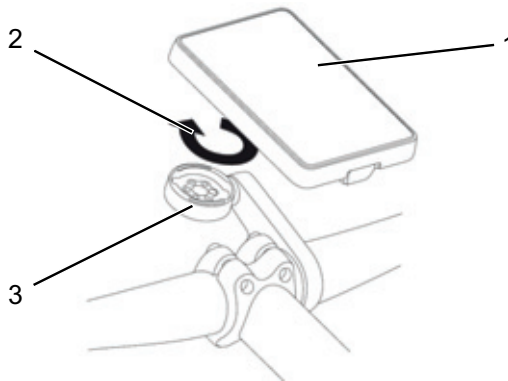


Figure 23: Attaching the display

Removing the display

- ▶ Disconnect the display from the intermediate cable.
- ▶ Turn the *display* 45° anticlockwise.
- ▶ Remove the *display* from above.

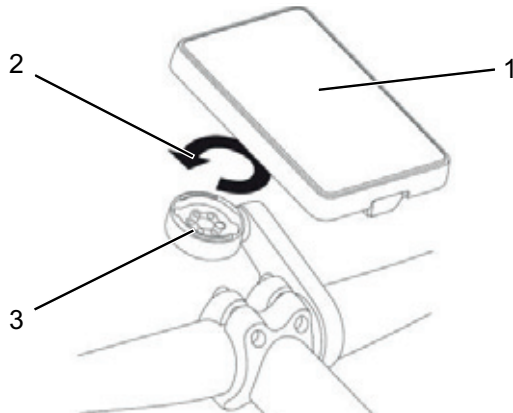


Figure 24:

Removing the display

- 1 Display
- 2 Rotation direction of the display
- 3 Mount

7.7.2

Using the driving light

- ✓ To switch on the *driving light*, the drive system has to be switched on already.
- ▶ Press the **headlight button** briefly.
- ⇒ The *driving light* is switched on, and the *driving light symbol* is displayed.
- ▶ Press the **headlight button** briefly again.
- ⇒ The *running light* is switched off, and the *driving light symbol* is not displayed.

7.7.3

Using the push assist system



Crash caused by strong acceleration

If the pedals are pressed with the push assist activated, the vehicle will accelerate rapidly. This may cause a crash with injuries.

- ▶ Never mount the vehicle with the push assist activated.
-



The pedals turn when using the push assist due to the system design.

- ▶ You must steer the vehicle securely with both hands when using push assist.
 - ▶ Allow for enough freedom of movement for the pedals.
 - ▶ Never use a push assist for slow riding.
-

The push assist helps the rider to push the vehicle. The maximum speed can be 6 km/h here.

- ▶ Press and hold the **push assist button** for longer than three seconds.
- ⇒ The push assist is activated. The *push assist symbol* is displayed.
- ▶ Release the **push assist button** to shut off the push assist.

7.7.4 Select level of assistance

- ▶ Press the **plus button**.
- ⇒ The level of assistance is increased.
- ▶ Press the **minus button**.
- ⇒ The level of assistance is reduced.

7.7.5 Switching the journey information

The displayed *journey information* can be changed and partially reset.

- ▶ Press the **info button** repeatedly until the *journey information* is displayed.

7.7.6 Using the USB port

NOTICE

Any moisture which enters through the USB port may trigger a short circuit in the *display*.

- ▶ Regularly check the position of the rubber cover on the USB port and adjust it as necessary.

The USB port can be used to operate external devices which can be connected using a standard micro A/ micro B USB 2.0 cable.

- ✓ The display has been inserted correctly into the mount.
- ▶ Open the protective flap on the USB port.
- ▶ Using a suitable USB cable, connect the USB interface and the desired end device.
- ⇒ The display "CHArG" will appear briefly on the display.
- ▶ Replace the protective flap after using the USB port.

7.7.7

Changing the system information

The following system settings can be changed:

Screen display	Function
RESET TRIP	Set trip time, calories burned, distance and average speed to 0
RESET ALL	Set all values incl. total distance and total trip time to 0
DATE	DD/MM/YY
TIME FORMAT	24/12
TIME	hh/mm
LANGUAGE	German/English
METRIC/IMPERIAL	km/mi

Table 26:

Changeable system settings

- ▶ Press and hold the **headlight button** for three seconds.
 - ▶ Press the **info button** repeatedly until the *journey information* is displayed.
 - ▶ Change values by pressing the **minus** and **plus buttons**.
 - ▶ When the values are correct, press the **info button** briefly.
 - ▶ Press and hold the **headlight button** for three seconds.
- ⇒ The *journey information* is displayed again.

7.8 Gear shift

The selection of the appropriate gear is a prerequisite for a physically comfortable ride. The ideal pedalling frequency is between 40 and 60 revolutions per minute.

7.8.1 Manual *Alternative*

▶ Select the appropriate gear with the *shifter* or *gear shift twist grip*.

⇒ The gear shift switches the gear.

7.8.2 Automated *Alternative*

7.8.2.1 Selecting the automated or manual gear shift

The continuously variable hub gear allows you to switch between the automatic shift mode (*NuVinci cadence*) and manual shift mode (*NuVinci Gear*).

▶ Select the item of journey information *NuVinci cadence* [▷ *Chapter 7.8.2.1, page 83*].

▶ Press and hold the Info button for longer than 1 second.

⇒ The operating modes *NuVinci cadence* and *NuVinci Gear* switch over.

- In *NuVinci cadence* operating mode (automatic shift), the ideal gear is selected automatically to ride with the desired pedalling frequency.
- In *NuVinci Gear* operating mode (manual gear shift), the preconfigured gears can be selected manually.

7.8.2.2

Adjusting the desired pedalling frequency

The set desired pedalling frequency is used to set the ideal gear for the current speed automatically.

- ✓ Only select the desired pedalling frequency when the vehicle is stationary.
 - ▶ Select the item of journey information *NuVinci cadence* [▷ *Chapter 7.8.2.1, page 83*].
 - ▶ Set the desired pedalling frequency:
 - Use the plus button to increase the pedalling frequency.
 - Use the minus button to reduce the pedalling frequency.
- ⇒ The pedalling frequency is displayed on the screen.

7.8.2.3

Selecting the gear manually

The level of assistance cannot be changed during manual shifting.

Select the item of journey information *NuVinci Gear* [▷ *Chapter 7.8.2.1, page 83*].

You select manual shift mode (*NuVinci Gear*) using the **i** button on the control panel on the handlebars.

- You press the **+** button on the control panel to select one gear higher.
- You press the **-** button on the control panel to select one gear lower.

The selected gear is displayed on the screen.

7.9

Brake**Hydraulic fluid can be fatal if it is swallowed and penetrates into the respiratory system**

Hydraulic fluid may leak out after an accident or due to material fatigue. Hydraulic fluid can be fatal if swallowed and inhaled.

First aid treatment

- ▶ Wear gloves and safety goggles as protective equipment. Keep unprotected persons away.
- ▶ Remove those affected from the danger area to fresh air. Never leave those affected unattended.
- ▶ Ensure sufficient ventilation.
- ▶ Immediately remove clothing items contaminated with hydraulic fluid.
- ▶ Serious slip hazard due to hydraulic fluid leakage.
- ▶ Keep away from naked flames, hot surfaces and sources of ignition.
- ▶ Avoid contact with skin and eyes.
- ▶ Do not inhale vapours or aerosols.

After inhalation

- ▶ Take in fresh air; consult doctor if any pain or discomfort.

After skin contact

- ▶ Wash affected skin with soap and water and rinse well. Remove contaminated clothing. Consult doctor if any pain or discomfort.

After contact with eyes

- ▶ Rinse eyes under flowing water for at least ten minutes with the lids open; also rinse under lids. Consult eye doctor if pain or discomfort continues.

After ingestion

- ▶ Rinse out mouth with water Never induce vomiting! Risk of aspiration!
- ▶ Place a person lying on their back who is vomiting in a stable recovery position on their side. Seek medical advice immediately.

Environmental protection measures

- ▶ Never allow hydraulic fluid to flow into the sewage system, surface water or groundwater.
- ▶ Notify the relevant authorities if fluid penetrates the ground or pollutes water bodies or the sewage system.



Amputation due to rotating brake disc

The brake disc in disc brakes is so sharp that it can cause serious injuries to fingers if they are inserted into the disc brake openings.

- ▶ Always keep fingers well away from the rotating brake disc.
-

 **WARNING**

Crash caused by brake failure

Oil or lubricant on the brake disc in a disc brake or on the rim of a rim brake can cause the brake to fail completely. This may cause a crash with serious injuries as a consequence.

- ▶ Never allow oil or lubricant to come into contact with the brake disc or brake linings or on the rim of a rim brake.
- ▶ If the brake linings have come into contact with oil or lubricant, contact a dealer or a workshop to have the components cleaned or replaced.

If the brakes are applied continuously for a long time (e.g. while riding downhill for a long time), the fluid in the brake system may heat up. This may create a vapour bubble. This will cause air bubbles or any water contained in the brake system to expand. This may suddenly make the lever travel wider. This may cause a crash with serious injuries.

- ▶ Release the brake regularly when riding downhill for a longer period of time.

 **CAUTION**

Crash caused by wet conditions

The *tyres* may slip on wet roads. In wet conditions you must also expect a longer braking distance. The braking sensation differs from the usual sensation. This can cause loss of control or a crash, which may result in injuries.

- ▶ Ride slowly and brake in good time.
-



Crash caused by incorrect use

Handling the brake improperly can lead to loss of control or crashes, which may result in injuries.

- ▶ Shift your body weight back and down as far as possible.
- ▶ Practice braking and emergency braking before the vehicle is used in public spaces.
- ▶ Never use the vehicle if you can feel no resistance when pressing the brake handle. Consult a specialist dealer.



Crash after cleaning or storage

The brake system is not designed for use on a vehicle which is placed on its side or turned upside down. The brake may not function correctly as a result. This can cause a crash, which may result in injuries.

- ▶ If the vehicle is placed on its side or turned upside down, apply the brake a couple of times before setting off to ensure that it functions normally.
- ▶ Never use the vehicle if it no longer brakes as normal. Consult a specialist dealer.



Burns caused by heated brake

The brakes may become very hot during operation. There is a risk of burns or fire in case of contact.

- ▶ Never touch the components of the brake directly after the ride.
-

The drive force of the motor is shut off during the ride as soon as the rider no longer pedals. The drive system does not switch off when braking.

- ▶ In order to achieve optimum braking results, do not pedal while braking.

7.9.1 Using the brake lever

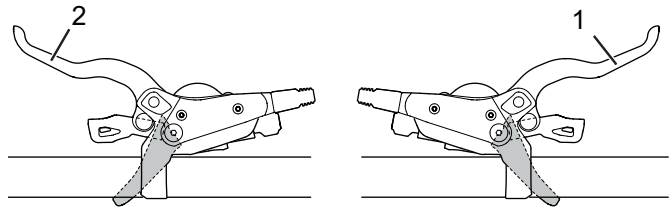


Figure 25: Front (2) and rear (1) brake lever; Shimano brake used as an example

- ▶ Push the left *brake lever for the front wheel brake* and the right lever for the rear wheel brake until the desired speed is reached.

7.9.2 Using the back-pedal brake *Alternative*

- ✓ The best braking effect is achieved if the pedals are in the 3 o'clock and 9 o'clock position when braking. To bridge the free travel between the riding movement and the braking movement, it is recommendable to pedal a little beyond the 3 o'clock and 9 o'clock position before you pedal in the opposite direction to the *direction of travel* and start braking.
- ▶ Pedal in the opposite direction to the *direction of travel* until the desired speed has been reached.

7.10

Horn



Risk of an accident if power fails

The horn no longer works if the battery fails. You will no longer be able to sound a warning in hazard situations. This may lead to an accident with serious injuries.

- ▶ Never ride the vehicle without a battery.
-

7.10.1

Sounding the horn

- ▶ Press on the horn button.
- ⇒ The horn sounds a warning.

8

Maintenance

Cleaning check list

<input type="checkbox"/>	Clean pedals	after each ride
<input type="checkbox"/>	Clean the battery	once a month
<input type="checkbox"/>	Chain (mainly tarmacked road)	every 250–300 km
<input type="checkbox"/>	Basic cleaning and preservation of all components	at least every six months
<input type="checkbox"/>	Clean the charger	at least every six months

Maintenance check list

<input type="checkbox"/>	Check USB rubber cover position	before each ride
<input type="checkbox"/>	Check for tyre wear	once a week
<input type="checkbox"/>	Check for rim wear	once a week
<input type="checkbox"/>	Check the tyre pressure	once a week
<input type="checkbox"/>	Check brakes for wear	once a month
<input type="checkbox"/>	Check electrical cables and Bowden cables for damage and ensure they are fully functional	once a month
<input type="checkbox"/>	Check the chain tension	once a month
<input type="checkbox"/>	Check the tension of the spokes	every three months
<input type="checkbox"/>	Check the gear shift setting	every three months
<input type="checkbox"/>	Check for wear on brake discs	at least every six months

Service check list

<input type="checkbox"/>	Inspection by the specialist dealer	every six months
<input type="checkbox"/>	Inspection of the drive unit	Every 15,000 km

8.1 **Cleaning and servicing**



CAUTION

Crash and falling caused by unintentional activation

There is a risk of injury if the drive system is activated unintentionally.

- ▶ Remove before cleaning.
-

The following servicing measures must be performed regularly. Servicing can be performed by the operator and rider. In case of any doubt, consult the specialist dealer.

8.1.1 **After each ride**

8.1.1.1 **Cleaning the pedals**

- ▶ Clean with a brush and soapy water after riding through dirt or rain.
- ⇒ Service the pedals after cleaning.

8.1.2 **Basic cleaning**



CAUTION

Crash caused by brake failure

The braking effect may be unusually weak temporarily after cleaning, servicing or repairing the vehicle. This may cause a crash with serious injuries.

- ▶ Never apply care products or oil to the brake discs or brake linings, or the braking surfaces on the rims.
 - ▶ After cleaning, servicing or repair, carry out a few test brake applications.
-

NOTICE

Water may enter into the inside of the bearings if you use a steam jet. This dilutes the lubricant inside, the friction increases and, as a result, the bearings are permanently damaged in the long term.

- ▶ Never clean the vehicle with a steam jet.
-

NOTICE

Greased parts, such as the seat post, the handlebars or the stem, may no longer be safely and reliably clamped.

- ▶ Never apply grease or oil to clamping sections.
- ✓ Remove battery and display before basic cleaning.

8.1.2.1**Cleaning the frame**

- ▶ Soak dirt stains on the frame with dish-washing detergent if the dirt is thick and ingrained.
- ▶ After leaving it to soak for a time, remove the dirt and mud with a sponge, brush and toothbrush.
- ▶ Use a watering can or your hand to rinse the frame to finish off.
- ▶ Service the frame after cleaning.

8.1.2.2**Cleaning the stem**

- ▶ Clean stem with a cloth and washing water.
- ▶ Service the stem after cleaning.

8.1.2.3**Cleaning the wheel**** WARNING****Crash caused by braking hard on rims**

A rim can break and block the wheel if you brake hard. This may cause a crash with serious injuries.

- ▶ Check rim wear on a regular basis.
- ▶ Check the tyres, rims, spokes and spoke nipples for any damage when cleaning the wheel.
- ▶ Use a sponge and a brush to clean the hub and spokes from the inside to the outside.
- ▶ Clean the rim with a sponge.

8.1.2.4

Cleaning the drive elements

- ▶ Spray the cassette, the chain wheels and the front derailleur with a degreasing agent.
- ▶ Clean coarse dirt with a brush after soaking for a short time.
- ▶ Wash down all parts with dish-washing detergent and a toothbrush.
- ▶ Service the drive elements after cleaning.

8.1.2.5

Cleaning the chain

NOTICE

-
- ▶ Never use aggressive (acid-based) cleaners, rust removers or degreasers when cleaning the chain.
 - ▶ Do not use chain cleaning devices or chain cleaning baths.
-
- ▶ Slightly dampen a brush with dish-washing liquid. Brush both sides of the chain.
 - ▶ Dampen a cloth with dish-washing liquid. Place the cloth on the chain.
 - ▶ Hold with slight pressure while slowly turning the rear wheel, so the chain passes through the cloth.
 - ▶ If the chain is still dirty afterwards, clean it with WD40.
 - ▶ Service the chain after cleaning.

8.1.2.6

Cleaning the battery**Risk of fire and explosion due to penetration by water**

The battery is only protected from simple spray water. Penetration by water can cause a short circuit. The battery may self-ignite and explode.

- ▶ Never clean the battery with a high-pressure water device, water jet or compressed air.
 - ▶ Never immerse the battery in water.
 - ▶ Never use cleaning agents.
 - ▶ Remove the battery from the vehicle before cleaning.
-
- ▶ Clean the battery electrical connections with a dry cloth or brush only.
 - ▶ Wipe off the decorative sides with a damp cloth.

8.1.2.7

Cleaning the display**NOTICE**

If water enters into the display, it will be permanently damaged.

- ▶ Never immerse the display in water.
 - ▶ Never clean with a high-pressure water device, water jet or compressed air.
 - ▶ Never use cleaning agents.
 - ▶ Remove the display from the vehicle before cleaning.
-
- ▶ Carefully clean the display with a damp, soft cloth.

8.1.2.8

Cleaning the drive unit



CAUTION

Burns from hot drive

The drive cooler can become extremely hot during use. Contact may cause burns.

- ▶ Leave the drive unit to cool before cleaning.
-



NOTICE

If water enters into the drive unit, the unit will be permanently damaged.

- ▶ Never immerse the drive unit in water.
 - ▶ Never clean with a high-pressure water device, water jet or compressed air.
 - ▶ Never use cleaning agents.
 - ▶ Never open.
-
- ▶ Carefully clean the drive unit with a damp, soft cloth.
-

8.1.2.9

Cleaning the brake



WARNING

Brake failure due to water penetration

The brake seals are unable to withstand high pressures. Damaged brakes can fail and cause an accident with injury.

- ▶ Never clean the vehicle with a high-pressure water device or compressed air.
 - ▶ Take great care when using a hosepipe. Never point the water jet directly at the seal section.
-
- ▶ Clean brake and brake discs with a brush, water and dish-washing detergent.
 - ▶ Clean brake discs thoroughly with brake cleaner or spirit.

8.1.3**Servicing****8.1.3.1****Servicing the frame**

- ▶ Dry frame after cleaning
- ▶ Spray with care oil Clean off the care oil again after a short time.

8.1.3.2**Servicing the stem**

- ▶ Apply silicone or Teflon oil to the stem shaft tube and the quick release lever pivot point.
- ▶ If you have speedlifter Twist, also apply oil to the unlocking bolt using the groove in the speedlifter body.
- ▶ Apply a little acid-free lubricant grease between the stem quick release lever and the sliding piece to reduce the quick release lever operating force.

8.1.3.3**Servicing the fork**

- ▶ Treat the dust seals with fork oil

8.1.3.4**Servicing the drive elements**

- ▶ Spray the cassette, the chain wheels and the front derailleur with a degreasing agent.
- ▶ Clean coarse dirt with a brush after soaking for a short time.
- ▶ Wash down all parts with dish-washing detergent and a toothbrush.

8.1.3.5**Servicing the pedals**

- ▶ Treat with spray oil after cleaning.

8.1.3.6**Servicing the chain**

- ▶ Grease the chain thoroughly with chain oil after cleaning.

8.1.3.7

Servicing the drive elements

- ▶ Service front and rear derailleur articulated shafts and jockey wheels with Teflon spray.

8.2

Maintenance**CAUTION****Crash and falling caused by unintentional activation**

There is a risk of injury if the drive system is activated unintentionally.

- ▶ Remove the battery before maintenance.

The following maintenance measures must be carried out regularly [▷ *Check list, page 91*]. They can be carried out by the operator and rider. In case of any doubt, consult the specialist dealer.

8.2.1

Wheel**WARNING****Crash caused by braking hard on rims**

A rim can break and block the wheel if you brake hard. This may cause a crash with serious injuries.

- ▶ Check rim wear on a regular basis.

NOTICE

If the pressure is too low in the tyre, the tyre does not achieve its load bearing capacity. The tyre is not stable and may come off the rim.

If the pressure in the tyre is too high, the tyre may burst.

- ▶ Check the tyre pressure against the specifications
 - ▶ *Adjust the tyre pressure* as necessary.
-
- ▶ Check the *tyre* wear.
 - ▶ Check the *tyre pressure*.
 - ▶ Check the *rims* for wear.
 - The rims of a rim brake with invisible wear indicator are worn as soon as the wear indicator becomes visible in the area of the rim joint.
 - The rims with visible wear indicator are worn as soon as the black, all-round groove on the pad friction surface is no longer visible. We recommend that you also replace the *rims* with every second brake lining replacement.
 - ▶ Check the tension of the spokes.

8.2.2

Checking the tyres

- ▶ Check the tyres for wear. The tyre is worn if the anti-puncture protection or the carcass cords are visible.
- ⇒ A specialist dealer needs to change the tyre if it is worn.

8.2.3

Checking the rims

- ▶ Check the *rims* for wear. The rims are worn as soon as the black, all-round groove on the pad friction surface becomes invisible.
- ⇒ Worn rims must be replaced by a specialist dealer.
- ⇒ We recommend that you also replace the *rims* at the same time as every second brake lining replacement.

8.2.4

Brake system



Crash caused by brake failure

Worn brake discs and brake linings, as well as a lack of hydraulic fluid in the brake cable, reduce the braking power. This may cause a crash with injuries.

- ▶ Check the brake disc, brake linings and the hydraulic brake system on a regular basis and replace if necessary.

The maintenance interval for the brake depends on the weather conditions and how frequent the vehicle is used. If the vehicle is used under extreme conditions such as rain, dirt or high mileage, maintenance must be performed more frequently.

8.2.5 Checking the brake linings for wear

Check brake linings after brake has been fully applied 1,000 times.

- ▶ Check that the brake lining is no less than 1.8 mm wide at any point and no less than 2.5 mm between the brake lining and supporting plate.
- ▶ Push brake lever and hold. In doing so, check the transport safety wear gauge can fit between the brake lining supporting plates.
- ⇒ The brake linings have not reached their wear limit. If they had, a specialist dealer would need to replace them.

8.2.6 Checking the pressure point

- ▶ Push brake lever and hold several times.
- ⇒ If you are unable to clearly detect the pressure point and it changes, a specialist dealer needs to vent the brake.

8.2.7 Checking the brake discs for wear

- ▶ Check that the brake disc is no less than 1.8 mm at any point.
- ⇒ The brake discs have not reached the wear limit. If they had, a specialist dealer would need to replace them.

8.2.8 Electrical cables and brake cables

- ▶ Check all visible electrical cables and cables for damage. If, for example, the sheathing is compressed, the vehicle will need to be removed from service until the cables have been replaced.
- ▶ Check all electrical cables and cables to make sure they are fully functional.

8.2.9

Gear shift

- ▶ Check the gear shift and the *shifter* or the *twist grip* setting and adjust it as necessary.

8.2.10

Stem

- ▶ The stem and quick release system should be inspected at regular intervals. The specialist dealer should adjust them if necessary.
- ▶ If the hexagon socket head screw is also loosened, the headset backlash also needs to be adjusted. Medium-strength thread locker, such as Loctite blue, then needs to be applied to the loosened screws and the screws tightened as per the instructions.
- ▶ Check for wear and signs of corrosion (maintain with an oily cloth) and for oil leaks.

8.2.11

Checking the chain tension

NOTICE

Excessive chain tension increases wear.

If the chain tension is too low, there is a risk that the *chain* or belt will slip off the *chain wheels*.

- ▶ Check the chain tension once a month.
-
- ▶ Check the chain tension in three or four positions, turning the crank a full revolution.
-
- ▶ If the *chain* can be pushed more than 2 cm, the *chain* will need to be tensioned again by the specialist dealer.
 - ▶ If the *chain* or belt can only be pushed up and down less than 1 cm, you will need to slacken the *chain* or belt slightly.



- ⇒ The ideal chain tension has been achieved if the *chain* or the belt can be pushed a maximum of 2 cm in the middle between the pinion and the toothed wheel. The crank must also turn without resistance.

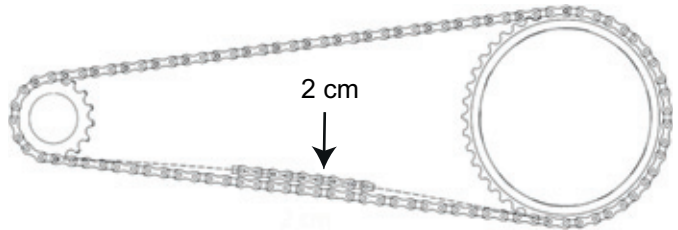


Figure 26: Checking the chain tension



- ▶ If a hub gear is featured, the rear wheel must be pushed backwards or forwards to tighten the chain. This should be done by a specialist only.

8.2.12 Checking the handlebar grip position

- ▶ Check the handlebar grip is firmly in position.

8.2.13 USB port

NOTICE

Any moisture which enters through the USB port may trigger a short circuit in the *display*.

- ▶ Regularly check the position of the *cover on the USB port* and adjust it as necessary.

8.3

Service



Injury to the eyes

Problems may arise if the settings are not made properly and you may sustain serious injuries as a result.

- ▶ Always wear safety glasses to protect your eyes when carrying out maintenance work such as replacing components.
-



Crash and falling caused by unintentional activation

There is a risk of injury if the drive system is activated unintentionally.

- ▶ Remove the battery before inspection.
-



Crash caused by material fatigue

If the service life of a component has expired, the component may suddenly fail. This may cause a crash with injuries.

- ▶ Have the specialist dealer carry out six-monthly basic cleaning of the vehicle, preferably at the same time as the required servicing work.
-



The motor is maintenance-free and may only be opened by qualified specialist personnel.

- ▶ Never open the motor.
-

The specialist dealer must perform an inspection at least every six months. This is the only way to ensure that the vehicle remains safe and fully functional.



- ▶ The specialist dealer will inspect the vehicle for any signs of material fatigue during basic cleaning.
- ▶ The specialist dealer will check the software version of the drive system and update it. The electrical connections are checked, cleaned and preservative agent is applied. The electrical cables are inspected for damage.
- ▶ The specialist dealer will dismantle and clean the entire suspension fork interior and exterior. They will clean and lubricate the dust seals and slide bushings, check the torques and adjust the fork to the rider's preferred position. They will also replace the sliding collar if the clearance is too great (more than 1 mm on the fork bridge).
- ▶ The specialist dealer will fully inspect the interior and exterior of the rear frame damper, overhaul the rear frame damper, replace all air seals of air forks, overhaul the air suspension, change the oil and replace the dust wipers.
- ▶ The further servicing measures correspond to those which are recommended for a vehicle as per EN 4210. Particular attention is paid to rim and brake wear. The spokes are re-tightened in accordance with the findings.

8.4

Adjusting and repairing



Injury to the eyes

Problems may arise if the settings are not made properly and you may sustain serious injuries as a result.

- ▶ Always wear safety glasses to protect your eyes when carrying out maintenance work such as replacing components.
-



Crash and falling caused by unintentional activation

There is a risk of injury if the drive system is activated unintentionally.

- ▶ Remove the battery before inspection.
-

8.4.1

Use original parts and lubricants only

The individual vehicle parts have been carefully selected and matched to one other.

Only original parts and lubricants must be used for maintenance and repair.

The constantly updated lists of approved accessories and parts are available to specialist dealers.

8.4.2

Wheel quick release**Crash caused by unfastened quick release**

A faulty or incorrectly installed quick release may become caught in the brake disc and block the wheel. This will cause a crash.

- ▶ Install the front wheel quick release lever on the opposite side to the brake disc.

**Crash caused by faulty or incorrectly installed quick release**

The brake disc becomes very hot during operation. Parts of the quick release may become damaged as a result. The quick release comes loose. This will cause a crash with injuries.

- ▶ The front wheel quick release lever and the brake disc must be situated on opposite sides.

**Crash caused by incorrectly set clamping force**

Excessively high clamping force will damage the quick release and cause it to lose its function.

Insufficient clamping force will cause a detrimental transmission of force. The suspension fork or the frame may break. This will cause a crash with injuries.

- ▶ Never fasten a quick release using a tool (e.g. hammer or pliers).
- ▶ Only use the clamping lever with the specified set clamping force.

8.4.2.1

Clamping the clamping lever

The clamping lever for the quick release is marked OPEN and CLOSE. If you can read the word OPEN, the quick release is open. If you can read the word CLOSE, the quick release is clamped.

- ▶ Align the clamping lever properly and push it through as far as it will go.
- ⇒ The wheel clamping lever is clamped if the clamping lever can be moved easily from the open final position into the middle and has to be pressed with the fingers or base of the thumb from the middle point onwards.

8.4.2.2

Clamping version I

- ▶ Hold the open clamping lever. Screw the setting nut tight on the opposite side.
- ▶ Clamp the clamping lever.
- ⇒ The final position of the clamping lever is at a right angle to the fork or frame.

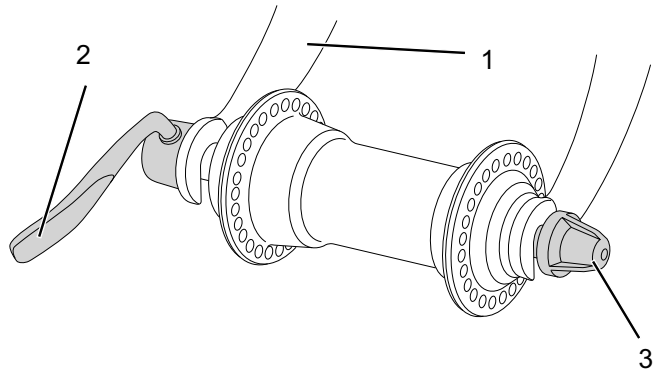


Figure 27:

Wheel quick release, version I, with clamping lever (2), fork (1) and setting nut (3)

Checking and setting the clamping force of the quick releases

If the clamping lever cannot be moved into the final position just by pushing it with the hand, or if it is too loose, its clamping force will need to be readjusted.

- ✓ The clamping lever is completely open.
- ▶ Turn the setting nut a little.
- ▶ Clamp the clamping lever.
- ▶ Repeat the steps until the proper angle has been achieved.

8.4.2.3

Clamping version II

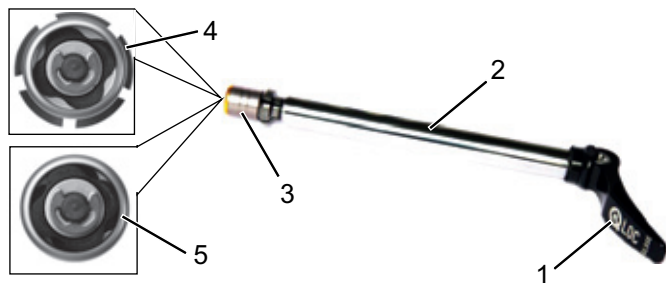


Figure 28:

Quick release, version II, with clamping lever (1), axle (2), setting nut (3), and detailed view of the open (4) and closed (5) flange

- ✓ The clamping lever is completely open.
- ▶ Push the axle into the hub as far as it will go.
- ▶ Align the clamping lever.
- ▶ Close the clamping lever
- ⇒ The final position of the clamping lever is forward, parallel to the fork.

8.4.2.4

Clamping version III

NOTICE

If the clamping force is insufficient, have the specialist dealer inspect it.

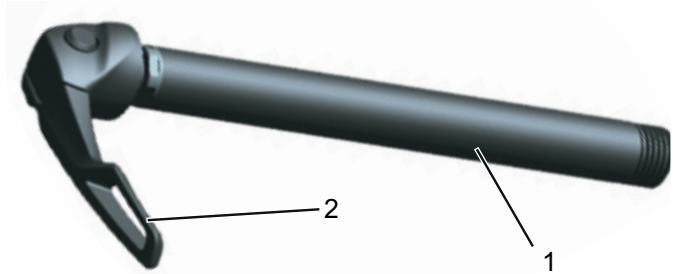


Figure 29:

Quick release, version III, with axle (1) and clamping lever (2)

- ▶ Push the axle into the hub as far as it will go with the clamping lever completely open.
- ▶ Screw the quick release on the open clamping lever clockwise into the hub as far as it will go.
- ▶ Screw it out one turn.
- ▶ Use the fingers to screw in the clamping lever in the semi-open position, roughly in the middle between OPEN and CLOSE, until you feel resistance.
- ▶ Clamp the clamping lever.

8.4.2.5

Clamping version IV

- ▶ Push the axle into the hub as far as it will go with the clamping lever open.
- ▶ Screw the clamping lever clockwise into the correct final position.
- ▶ Clamp the clamping lever.

Setting the clamping force

If the clamping force is set too high, the clamping lever cannot be pushed into the closed final position.

- ▶ Turn the twist knob:
 - Turn 1/8 turn anti-clockwise to reduce the clamping force.
 - Turn 1/8 turn clockwise to increase the clamping force.
- ▶ Clamp the clamping lever.
- ▶ If the clamping lever is not yet in the proper final position, repeat the steps until the proper final position has been achieved.

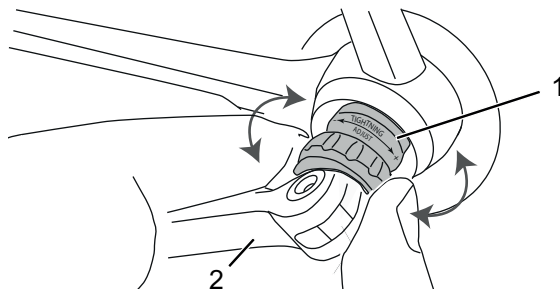


Figure 30:

Wheel quick release, version IV, with twist knob (1) and clamping lever (2)

8.4.2.6

Clamping version V



Crash caused by unfastened quick release

The clamping force of the quick release lever is set once during assembly and is not an indication that the wheel axle is sufficiently fastened. The axle may come loose if the closed quick release is turned. This will cause a crash with injuries.

- ▶ Never adjust or turn a quick release after closing it, e.g. to correct the final position.
- ▶ Push the axle into the hub from the left until it meshes in the thread on the right-hand fork end.

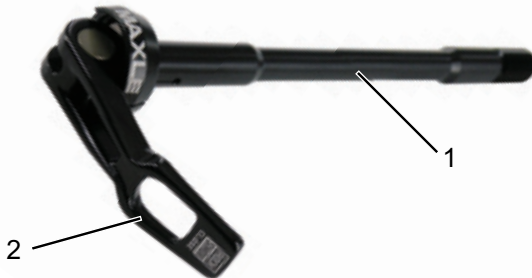


Figure 31:

Quick release, version V, with axle (1) and clamping lever (2)

- ▶ Flip the quick release lever into the recess.

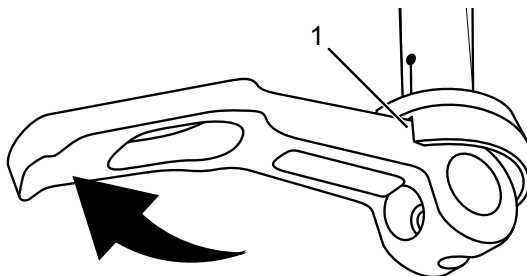


Figure 32:

Flipping the quick release into the recess (1)

- ▶ Turn the axle on the quick release clockwise until the axle is firmly in place.
- ▶ Pull the lever from the recess and clamp it properly.
- ▶ The clamping force of the lever is not an indication of the tightening torque of the axle.

Setting the clamping force

If the clamping lever cannot be moved into its proper final position by pushing it with the hand, or if it is too loose, its clamping force will need to be readjusted.

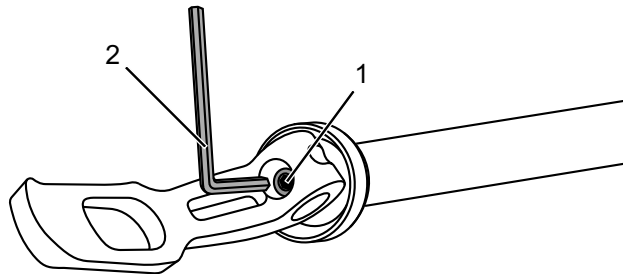


Figure 33:

Setting the clamping force in the middle of the clamping lever (1) with a hexagon socket spanner (2)



- ▶ Open the quick release lever.
- ▶ Connect a 2.5 mm hexagon socket spanner to the middle of the clamping lever.
- ▶ Turn the hexagon socket spanner:
 - turn clockwise to increase the clamping force and
 - anti-clockwise to reduce the clamping force.
- ▶ Clamp the clamping lever.
- ▶ If the clamping lever is not yet in the proper final position, repeat the steps until the proper final position has been achieved.

8.4.3

Brake



Injury due to damaged brakes

Special tools and specialist knowledge are required to repair the brakes. Incorrect or unauthorised assembly can damage the brakes. This may lead to an accident with injuries.

- ▶ Only specialist dealers may carry out repairs on brakes.
- ▶ Never carry out work or changes (such as dismantling, sanding or painting) which are not explicitly allowed and described in the brake user manual.



Hazard for the environment due to toxic substances

The brake system contains toxic and environmentally harmful oils and lubricants. These will contaminate if they enter the sewers or groundwater.

- ▶ Dispose of lubricants and oils left over after repairs in an environmentally responsible way
- ▶ in accordance with statutory regulations.



Special tools, special lubricants and knowledge of suspension components are required to maintain and repair brake discs, such as venting brakes or replacing the brake discs. The brakes may become damaged if procedures are not followed as described. Only specialist dealers may carry out maintenance on brakes. You will find the maintenance and repair instructions at:

<https://www.bulls-bikes.com/service/downloads.html>

8.4.4

Replacing the lighting



The specialist dealer must replace the entire light unit if an LED fails. You will find the repair instructions; <https://www.bulls-bikes.com/service/downloads.html>

8.4.5

Setting the headlight

- ▶ The *headlight* must be set, so that its light beam meets the road 10 m in front of the vehicle.

8.4.6 Tyres

8.4.6.1 Adjusting the tyre pressure

- ✓ It is recommendable to use a bicycle pump with a pressure gauge. The operating instructions for the bicycle pump must be adhered to.
- ▶ Unscrew and remove the valve cap.
- ▶ Connect the bicycle pump.
- ▶ Pump up the tyre slowly and pay attention to the tyre pressure in the process.
- ⇒ The tyre pressure has been adjusted as per the specifications.
- ▶ Remove the bicycle pump.
- ▶ Screw the valve cap tight.
- ▶ Screw the rim nut gently against the rim with the tips of your fingers.



Figure 34: Schrader valve with rim nut (1)

8.4.6.2 Puncture and tyre protection

If a foreign body should cause a puncture, the tyre should be replaced and Schwalbe anti-puncture liquid should be used until it is replaced.

Anti-puncture liquids are useful for repairing small punctures when out and about without dismounting the tube or tyre. More serious damage such as cuts or snake bites cannot be repaired with anti-puncture liquids.

There are basically two different types of anti-puncture liquid: The first type of liquid is purely mechanical. The liquid does not contain any fibres or particles which plug the hole. The advantage is that the liquid is unlimited in its effect. The disadvantage is that the hole is not really repaired. It is only plugged and may open up again – when pumping, for example.

The second fluid type is latex-based. The latex milk solidifies in the hole, repairing it permanently. Unfortunately, such liquids are only effective on the tube for a limited time as they harden at some point. Doc Blue anti-puncture liquid is effective as a remedy on tyres for about 2–7 months or about 2,000 km and offers additional protection for rides in extremely prickly or thorny terrain.

- ▶ Shake the anti-puncture liquid bottle well.
- ▶ Remove the valve insert.
- ▶ Fill 25–50 ml into the tube.
- ▶ Spin the wheel.

8.4.7

Repair by specialist dealer



Special knowledge and tools are required for many repairs. Only a specialist dealer may carry out the following repairs, for instance: Changing *tyres* and rims, changing brake linings and discs, or changing or tensioning the *chain*.

8.4.8

Initial help with system messages



Risk of fire and explosion due to faulty battery

The safety electronics on damaged or faulty batteries may fail. The residual voltage can cause a short circuit. Batteries may self-ignite and explode.

- ▶ Batteries with external damage must be removed from service immediately.
 - ▶ Never allow damaged batteries to come into contact with water.
 - ▶ If a battery is dropped or struck but shows no signs of external damage, remove it from service and observe it for at least 24 hours.
 - ▶ Faulty batteries are hazardous goods. Dispose of faulty batteries properly and as quickly as possible.
 - ▶ Store in a dry place until disposal. Never store in the vicinity of flammable substances.
 - ▶ Never open or repair batteries.
-

The components of the drive system are checked constantly and automatically. If an error is detected, the respective error code appears on the *display*. The drive may be shut off automatically, depending on the type of error.

8.4.8.1

Initial help

If an error message is displayed, run through the following actions:

- ▶ Make a note of the system message.
- ▶ Shut off and re-start the drive system.
- ▶ If the system message is still displayed, remove and then re-insert the battery.
- ▶ Re-start the drive system.
- ▶ Contact your specialist dealer if the system message is still displayed.

8.4.9 Initial help in case of complete failure

Problem	Possible cause	Solution
Display and/or drive system cannot be activated.	Battery malfunction despite full charge.	<ul style="list-style-type: none"> ▶ Press the On-Off button (battery). ▶ Check whether the battery can be switched on. ⇒ The LEDs on the battery charge level indicator should illuminate. ⇒ If this is not the case, the battery may be defective. Contact your specialist dealer.
	Battery is not correctly positioned in the mount.	<ul style="list-style-type: none"> ▶ Remove the battery. ▶ Replace it again. Make sure it is positioned correctly.
	Battery is not charged.	<ul style="list-style-type: none"> ▶ Fully charge the battery with the charger supplied.
	Contacts of the battery and/or mount are dirty.	<ul style="list-style-type: none"> ▶ Make sure that all contacts are clean. ▶ If necessary, clean them with a soft, dry cloth.
	Display is not correctly positioned in the mount.	<ul style="list-style-type: none"> ▶ Remove the display and replace it again. Make sure it is positioned correctly.
	Contacts on the display unit (1) and/or the mount (2) are dirty.	<ul style="list-style-type: none"> ▶ Make sure that all contacts are clean. ▶ If necessary, clean them with a soft, dry cloth.
	Plug connections are not properly inserted into the drive unit.	<ul style="list-style-type: none"> ▶ Check the cables and plug connections. ▶ If necessary, connect them properly.

8.5

Accessories

Basic rules for attaching accessories

	Child seats	We strongly advise against fitting a child seat for safety reasons
	Trailer	Not permitted
	Additional battery headlight	Not permitted
	Use of baskets	Not advisable
<input type="checkbox"/>	Non-permanently attached bags on the pannier rack	Permitted
<input type="checkbox"/>	Top cases on the pannier rack	Permitted

The following accessories are recommended:

<i>Description</i>	<i>Article number</i>
Protective cover for electrical components	080-41000 ff
Panniers	080-40946
Vehicle box	080-40947

Table 27:

Accessories

9

Recycling and disposal



Risk of fire and explosion

The safety electronics on damaged or faulty batteries may fail. The residual voltage can cause a short circuit. Batteries may self-ignite and explode.

- ▶ Remove batteries with external damage from service immediately and never charge them.
- ▶ If the battery becomes deformed or begins to smoke, keep at a safe distance, disconnect the power supply at the socket, and notify the fire service immediately.
- ▶ Never extinguish damaged batteries with water or allow them to come into contact with water.
- ▶ Faulty batteries are hazardous goods. Dispose of faulty batteries properly and as quickly as possible.
- ▶ Store in a dry place until disposal. Never store in the vicinity of flammable substances.
- ▶ Never open or repair the battery.



Chemical burns to the skin and eyes

Liquids and vapours may leak from damaged or faulty batteries. They can irritate the airways and cause burns.

- ▶ Avoid contact with leaked liquids.
 - ▶ Immediately consult a doctor in case of contact with the eyes or any discomfort.
 - ▶ In case of contact with the skin, rinse off immediately with water.
 - ▶ Ventilate the room well.
-



Hazard for the environment

The fork, rear frame damper and hydraulic brake system contain toxic and environmentally harmful oils and lubricants. These will contaminate if they enter the sewers or groundwater.

- ▶ Dispose of lubricants and oils in an environmentally responsible way in accordance with statutory regulations.
-



This device is marked according to the European Directive 2012/19/EU on waste electrical and electronic equipment – WEEE and accumulators (Directive 2006/66/EC). The directive provides the framework for the EU-wide return and recycling of used devices, which are collected separately and in an environmentally sound manner. The vehicle, battery, motor, display and charger are recyclable materials. You must dispose of and recycle them separately from domestic waste in compliance with the applicable statutory regulations. Sorted waste collection and recycling saves on raw material reserves and ensures that all the regulations for health and environmental protection are met when the product and/or the battery are recycled.

- ▶ Never dismantle the vehicle, battery or charger for disposal.
- ▶ The vehicle, display, the unopened and undamaged battery and the charger can be returned to any specialist dealer free of charge. Depending on the region, further disposal options may be available.
- ▶ Store the individual parts of the decommissioned vehicle in a dry place, free from frost, where they are protected from direct sunlight.

10 Appendix

10.1 System messages

Code	Description	Method of resolution
10	The battery voltage is too low.	▶ Charge the battery with the charger.
11	The battery voltage is too high.	▶ Switch off the system completely using the On-Off button on the battery and then switch it on again. ▶ Contact your specialist dealer if the problem persists.
12	The battery is almost or completely discharged.	▶ Charge the battery with the charger.
20	Electrical measurements are incorrect.	▶ Switch off the system completely using the On-Off button on the battery and then switch it on again. ▶ Contact your specialist dealer if the problem persists.
21	The temperature sensor is faulty.	
23		
24	The internal voltage is outside the working range.	▶ Charge the battery with the charger.
25	Error in the motor current measurement.	▶ Switch off the system completely using the On-Off button on the battery and then switch it on again. ▶ Contact your specialist dealer if the problem persists.
26	A software reset was carried out.	
30	Error in the push assist system.	
40	Overcurrent detected in the motor.	▶ Reduce the motor load by pedalling less or reducing the level of assistance
41	Overcurrent detected in the motor.	▶ Reduce the motor load by pedalling less.
42	Fault in the motor rotation.	▶ Switch off the system completely using the On-Off button on the battery and then switch it on again. ▶ Contact your specialist dealer if the problem persists.
43	Short circuit in motor.	
44	Motor is overheating.	▶ Reduce the motor load by pedalling less or reducing the level of assistance.

Table 28: List of system messages

Code	Description	Method of resolution
45	The software has corrected an error during motor rotation.	▶ Switch off the system completely using the On-Off button on the battery and then switch it on again.
46	No motor movement detected, although a current >2A was measured.	▶ Contact your specialist dealer if the problem persists.
60	Interruption of data exchange on the CAN-BUS.	▶ Check the cables and connectors of all components of the drive system.
70	Pedal force not in the valid range.	
71	No pedal rotation detected.	▶ Switch off the system completely using the On-Off button on the battery and then switch it on again.
72	No pedal force detected.	▶ Contact your specialist dealer if the problem persists.
73	Fault in connection to pedal force sensor.	
80	Incorrect motor parameter.	▶ Switch off the system completely using the On-Off button on the battery and then switch it on again. ▶ Contact your specialist dealer if the problem persists.
81	Speed not detected.	▶ Make sure that the spoke magnet is correctly positioned opposite the speed sensor.
82	The program was manipulated.	▶ Switch off the system completely using the On-Off button on the battery and then switch it on again.
83	Error in program process.	
84	Incorrect motor parameter.	▶ Contact your specialist dealer if the problem persists.

Table 28: List of system messages

10.2 Parts and repair list

Components	Part	Repair instructions
Fork	BULLS Design	info@zeg.de
Display	Brose, BLOKS CI	http://www.broseebike.com/de/service/
Motor	Brose	http://www.broseebike.com/de/service/
Front and rear brakes	Magura Type 7 P Performance	www.magura.com/en/components/techcenter/
Brake disc	Magura Storm HC	
Brake lever	Magura, MT4 E with ball end	
Brake pads	Magura Type 7 P Performance	
Hub, front	Formula, DC-71	info@zeg.de
Hub, rear	Formula, DC-22LWQR	info@zeg.de
Front and rear rims	WTB, XC-21D, SLEEVED TYPE DISC TYPE, ALLOY BLACK, 700C (622)	info@zeg.de
Spokes, front	STAINLESS BLACK, FRONT:14Gx32H	info@zeg.de
Spokes, rear	STAINLESS BLACK, FRONT:14Gx32H	info@zeg.de
Front and rear tyres	50-622 0B on rim 622 x 28	http://www.schwalbe.com/en/kundenservice-121
Crank	MIRANDA CLASSIC, BROSE 170MM	info@zeg.de
Chainring set	SUNTOUR, CRG773+CPG414-1/2	info@zeg.de
Pedals	WELLGO, C-098DU	en.wellgopedal.com/download_list.php?cid=2
Chain	KMC, X10E, NP/NP	info@zeg.de
Derailleur	Shimano, RD-M6000GS-10	si.shimano.com/#/de/search/Series
Pinion	Shimano, CS-HG500-10, 10-SPD	
Cassette sprockets	Shimano CS-HG-10 11-42 T	
Shifter	Shimano UM-6T80A-004-01	
Saddle	SELLE ROYAL, LOOK-IN MODERATE	info@zeg.de
Seat post	KALLOY, SP-368	info@zeg.de
Headlight	BUSCH MÜLLER IQ-X	https://www.bumm.de/en/products.html
Rear light and spotlight	BUSCH & MÜLLER, 323KRAD	
Side reflector	BUSCH & MÜLLER, #640	
Horn	BUSCH & MÜLLER horn, #660	

Table 29: Parts list for Lacuba Evo 45 Sport

Components	Part	Repair instructions
Stem	KALLOY, AS-021	info@zeg.de
Vehicle stand	HEBIE, #0665 E, E FIX 18,	info@zeg.de
Registration plate holder	BULLS Design	info@zeg.de
Handlebars	KALLOY, HB-RB11-ENM	info@zeg.de
Handles	TOPEAK/ERGON, GENT:GP3-L OEM	info@zeg.de
Rear mirror	POLY AUTO TECHNOLOGY, FUXON M-1 MIRROR,	service@zeg.de

Table 29: Parts list for Lacuba Evo 45 Sport

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