INFO recumbent technology

…recline in style!















HP VELOTECHNIK

Operating Manual
and Service Instructions
for HP VELOTECHNIK Tricycles
Gekko 26, Gekko fx 20, Gekko fx 26
Scorpion, Scorpion fx 20, Scorpion fx 26
Scorpion fs 20, Scorpion fs 26
Scorpion fs 26 Enduro, Scorpion fs 26 S-Pedelec

August 2025



Serial numbers of your recumbent and its parts:

Introduction

Dear customer,

thank you for buying a recumbent tricycle designed by HP VELOTECHNIK and congratulations on the purchase of your new recumbent tricycle! With this high-quality touring tricycle, you will enjoy many years of exhilarating riding pleasure.

Your safety and your satisfaction are our main concern. On the following pages, this manual will inform you about important safety issues as well as maintenance and care instructions.

Even if you have many years of experience with bicycles please do take your time to read this manual carefully before the first ride. Your recumbent tricycle is designed with the latest recumbent technology by HP VELOTECHNIK that partly needs special treatment and care.

In this manual, you will find detailed instructions on how to optimize your tricycle to meet your demands and riding style as well as your size and weight. In addition to this, we have put together a collection of information on care and maintenance as well as special technical advice from our engineers. Important: Please send us the attached warranty registration form for your extended warranty (see page 97).

This guide helps you to keep your tricycle in perfect condition so you will always experience maximum fun, comfort and safety.

Enjoy yourselves and have a great ride!

Paul J.W. Hollants, Dipl.-Ing. Daniel Pulvermüller
and the HP VELOTECHNIK team

P.S. workshop videos for attaching accessories and working on your recumbent bike can be found at www.hpvelotechnik.com.

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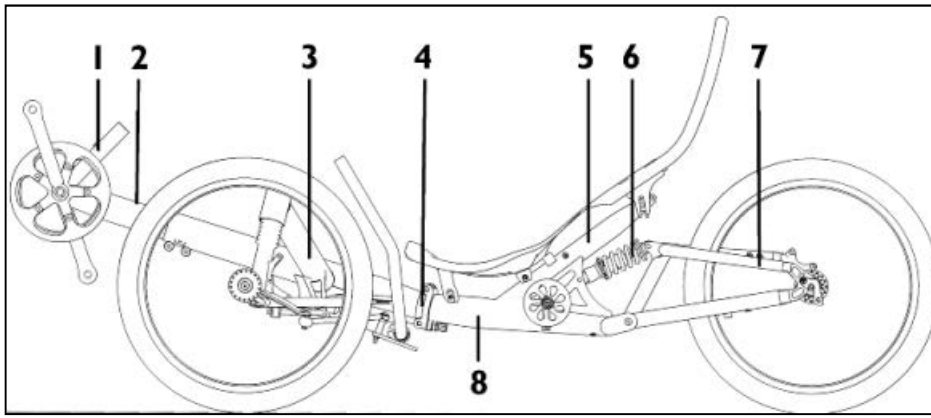
Service plan **107**

Version August 2025. For latest product information and manuals, visit our website at www.hpvelotechnik.com.

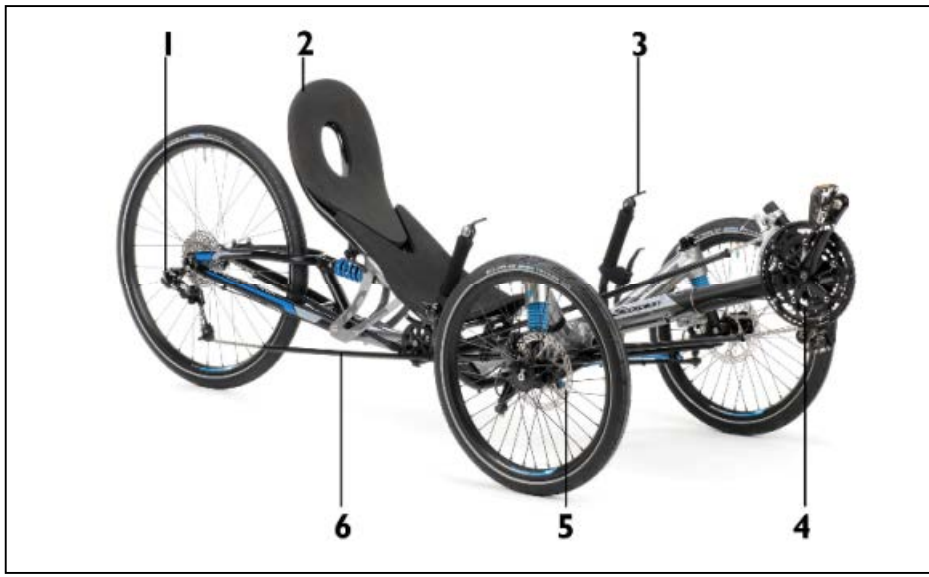
HP VELOTECHNIK GmbH & Co. KG
Kapellenstraße 49
65830 Kriftel / Germany
Phone. +49 61 92 - 97 99 2 - 0
Fax +49 61 92 - 97 99 2 - 299

Part Designation

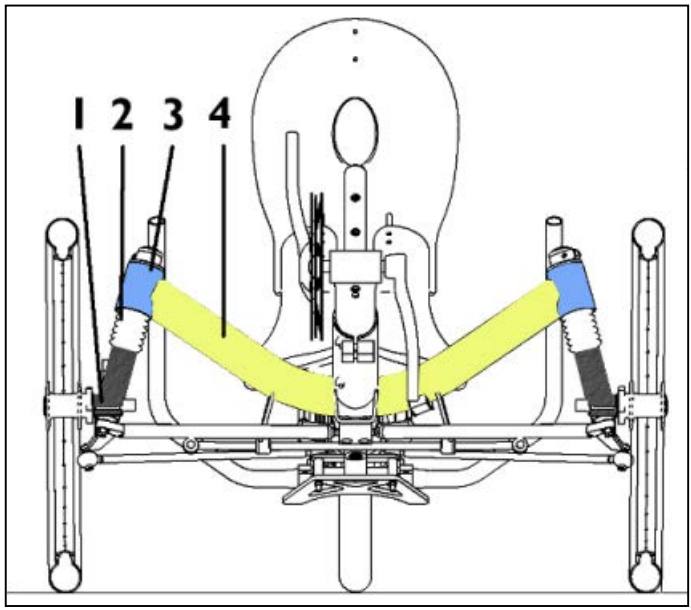
The following recumbent parts are not available on every model, they may look different or be combined depending on the model.



1 – derailleur tube
2 – front boom
3 – cross tube
4 – folding hinge
5 – seat tube
6 – rear shock
7 – swing arm
8 – main frame



1 – rear derailleur
2 – BodLink seat
3 – barend shifter
4 – chainring
5 – brake disc
6 – chain protection tube



1 – wheel carrier
2 – below (only on trikes with front suspension)
3 – head tube
4 – cross tube



1 – tie rod
2 – anti-roll bar
3 – wishbone

General safety instructions

The manuals of component manufacturers such as the brake manufacturer, the gear system manufacture

r, and the pedal manufacturer also belong to this manual. They give detailed information on operating and maintaining these specific parts. Please read the manuals of the part manufacturers as carefully as this manual. Please provide this manual to any other user of your recumbent before using it.

The maintenance and adjustment of this recumbent partly requires special tools and skills. Do only works within your limits and, for the purpose of your own safety, do not go beyond.

Should you be uncertain at any point, get in contact with your local dealer. The instructions in this manual apply only to a completely assembled HP VELOTECHNIK tricycle with standard parts from the series production of HP VELOTECHNIK. On special demand HP VELOTECHNIK delivers frame kits to put a specialist dealer in a position to assemble a tricycle individually. In this case the manuals on the operation and maintenance of the parts only represent a guideline, please read every manual of every part manufacturer separately.

The specialist dealer is responsible for the expert assembly, please contact him for detailed information! A tricycle that has been assembled from a frame kit must always be tested and approved by a qualified bicycle mechanic before your first ride.

The texts in the grey boxes are particularly important for your safety. Please read them carefully. The signs explained below will be used in this document without being explained again!

⚠ **Danger!** Texts that begin with "Danger!" mark an immediate danger for your life and your health. Please read them carefully.

⚠ **Attention!** Hints with the text "Attention" are important for your safety.



General safety instructions

Intended use

Your HP VELOTECHNIK tricycle is a bike for the use on streets and paved roads.

This tricycle is not designed for the use in racing and off-road riding, for jumping or acrobatics, and you must not ride across curbs, stairs, etc.

The Scorpion fs 26 Enduro is a bicycle that can additionally be used on unpaved roads.

The Scorpion fs 26 S-Pedelec belongs to the EU-vehicle classification category L2e (three-wheel moped) with speeds of up to 45 km/h (28 mph).

Using your bike on public roads is only allowed if it has been equipped with the accessories that are required by the applicable traffic regulations of the country in which you are using it.

Never drive without holding on! Before your first ride, read the chapter "Riding a recumbent tricycle" and get carefully used to the different vehicle performance.

This bicycle is designed for riders aged 14 years and older. Riders under 18, as well as individuals with limited cognitive abilities, must be supervised and instructed by a responsible adult. They must be able to understand and follow all safety and operating instructions contained in this manual.

The bicycle must not be used by anyone with significant sensory impairments, insufficient strength or mobility, or medical conditions that prevent safe participation in road traffic. Pregnant riders should exercise particular caution due to an increased risk of injury.

When used as intended and maintained properly, the bicycle has a minimum expected service life of 10 years.
Damage resulting from misuse, incorrect assembly, deliberate actions, accidents, or similar causes is not covered by warranty or liability claims against HP VELOTECHNIK.

Intended use includes adherence to all prescribed operating, maintenance, and servicing requirements.

Reuse

An HP VELOTECHNIK recumbent tricycle is suitable for reuse if used as intended and after an inspection by specialised personnel.

Load capacity

It is important to adjust the spring stiffness of the suspension according to the load, see the chapter about adjusting the suspension in this manual.

<u>Scorpion fx, Scorpion fs 26 /Enduro</u>

The maximum load (rider + luggage) is 140 kg (308 lbs). The maximum total weight (bicycle + rider + luggage) is 160 kg (352 lbs). The lower limit is valid. With a coupled trailer, the maximum total weight must not exceed 160 kg (352 lbs).
When riding the Scorpion fs 26 Enduro on unpaved roads the maximum load is 110 kg (242 lbs), the maximum total weight is 130 kg (286 lbs).

The permitted axle load is 100 kg (220 lbs) on the front axle and 95 kg (209 lbs) on the rear axle.

<u>Scorpion fs 26 S-Pedelec</u>

The maximum load (rider + luggage) is 130 kg (286 lbs). The maximum total weight (bicycle + rider + luggage) is 160 kg (352 lbs). The lower limit is valid.

The permitted axle load is 100 kg (220 lbs) on the front axle and 95 kg (209 lbs) on the rear axle.

Scorpion, Scorpion fx 26, Scorpion plus 20, Scorpion plus 26, Gekko 26

The maximum load (rider + luggage) is 150 kg (330 lbs). The maximum total weight (bicycle + rider + luggage) is 170 kg (374 lbs). The lower limit is valid. With a coupled trailer, the maximum total weight must not exceed 170 kg (374 lbs).

Scorpion fs 20, Gekko fx 20 and Gekko fx 26

The maximum load (rider + luggage) is 130 kg (286 lbs). The maximum total weight (bicycle + rider + luggage) is 150 kg (330 lbs). The lower limit is valid. With a coupled trailer, the maximum total weight must not exceed 150 kg (330 lbs).

Carrying luggage

Carrying luggage is only allowed on the special racks designed by HP VELOTECHNIK. The HP VELOTECHNIK racks are intended for rear wheel panniers. The lowrider fits for smaller, standard lowrider bags (front wheel bags). A license plate and rear light holder mounted on the carrier must not be loaded with luggage.



Carrier on Scorpion plus 26 and additional lowrider

On the models Scorpion, Scorpion fs 26 /Enduro /S-Pedelec, as well as on Scorpion plus 26 only panniers can be used. If a Top Load rack is also mounted, the rack platform can be loaded with a maximum of 10 kg. Please note the total load allowed.

With Scorpion fx, Scorpion fs 20 and Scorpion plus 20 additional luggage can be stowed on the luggage carrier platform.

When a rear rack is mounted you have to make sure that when the rear suspension is fully compressed there is at least a 1 cm (1/3") distance between the rear tire (or mudguard) and the rear rack.

If you want to increase this distance you have to decrease the suspension travel of the rear suspension element with clip-on spacers. For that purpose, please consult your local dealer.

Danger! Additional load can influence the handling of your tricycle considerably. If you plan on riding with heavy luggage, we advise you to make a test ride on a street with no traffic to get used to the new situation.

The load should be placed as close to the body of the rider as possible, since this results in better riding performance. You can also improve the handling of the tricycle by positioning the centre of gravity of the luggage as low as possible, so pack heavy items in the bottom of your panniers.

Take care that your luggage is safely stored on the racks. Bags must be tightly fastened to the racks so they cannot move. Make sure that loose parts like straps or belts cannot touch the wheels, the derailleur, or the suspension.

The rear rack is designed for standard tricycle panniers. Take care that your luggage does

not cover the lighting system and the reflectors of your tricycle and that they stay fully functional.

Make sure that through your luggage the lighting devices and reflectors of your bike are not concealed and remain fully functional.

If your bike is equipped with an electric assist system make sure that the electric cables securely seated and are not kinked.

Maximum load for carriers:

The maximum load on the rear rack is 25 kg (55 lbs).

The maximum load on the lowrider rack for Scorpion fx20 /fx26, Scorpion plus 20 and Scorpion plus 26 is 25 kg (55 lbs).

A TopLoad rack can be loaded with a maximum of 10 kg.

Please note the total load allowed.



Carrier on Scorpion fs 20



Carrier and lowrider on Scorpion fx 20

Final assembly

Your tricycle has been delivered to your specialist dealer only partly assembled.

Your dealer has to have carefully finished the assembly, perhaps altered the specification of your tricycle to meet your special requirements and performed a test ride. Please make sure that this pre-delivery service is recorded in the Warranty Pass at the end of this manual.

All screws must be checked and tightened, especially on the handlebar, stem, knuckles, swingarm pivot and wheels. Please follow the tightening torque settings listed in the table on page 95.

Derailleurs and brakes must be checked and adjusted. Please follow the instructions in the manuals of the parts manufacturers that come with this manual.

Bolts and nuts

Screws gradually settle in and hence they can come loose. Therefore, check the screws regularly if they are tightened appropriately with a torque wrench.

In the tables on page 95 you will find the prescribed tightening torques, they refer to greased screws!

Attention! Screws must be tightened with prescribed tightening torque. In this manual tightening torques are given in "Nm"(Newton meter). Always use a torque wrench wherever a torque setting is given in this manual. Never rely on "feeling". Screws tightened too much or not enough can break, which can lead to dangerous accidents. In case you don't own a torque wrench have your bicycle mechanic do the respective work. You will find tables with the prescribed torque settings on page 95 and 95 in this manual.

The grease also prevents your screws from seizing in their threads so that they won't unscrew anymore. In particular, screws made of stainless steel are susceptible to this and therefore have always to be put in with grease.

Do use high quality acid free grease, if possible, a lubricant with added solid particles like Teflon or MoS2. Their ingredients still work properly after the thinner grease has been removed from the contact surfaces. Alternatively, you can use thread locker that you apply to the screw before you put it into the thread.

Always check the screws very diligently for signs of corrosion. Rust at the screw heads may also lead to the screw seizing in the thread. When the metallic and shiny coating of galvanised screws comes off and discloses dull, grey-brown steel you have to exchange the screw.

When you exchange screws please only use screws of the same type. Screws come in different strength classes. Please only use galvanised screws of the same type and strength, corresponding to the German strength class 8.8 or stainless steel screws grade A2-70, when not given any other recommendation. If you are in doubt, please ask your specialist dealer.

Quick release levers

Quick release levers hold wheels and seat in position. A quick release lever consists of two basic parts: the lever on one side provides the clamping force. With the adjusting nut on the other side you adjust the clamping tension on the screw thread.

Danger! An incompletely or improperly closed quick release can result in parts coming loose and hence in a crash, possibly resulting in serious injury.

To open the quick release, move the lever away from the frame. In doing so the inscription "open" should be visible on the lever.

To close the quick release, move the lever with power in the other direction so that the word "close" is visible on the outward side of the lever. At the start of the lever's motion, for, say, half of its movement, the lever should move very easily, without any clamping action.

In the second half of the lever's movement the force on the leer should increase considerably, corresponding in the end to 15-20 kg (46 lbs). In its final position, the lever should come parallel with the tricycle and should not stick out to one side.

Check the security of the lever by attempting to twist the lever. If the lever can be made to pivot around in a circle the clamping is too loose. You must re-open the quick release, hold the lever and increase the clamping tension. Do this by screwing the adjustment nut on the other side by half a turn. Close the lever and check the clamping anew.

Finally, check that the part being secured is firmly fixed: Lift each wheel several inches off the ground and give it a slap onto the tire

from above. A properly fixed wheel will remain secure in the frame's dropouts.

Parts that are fastened with a quick release open easily. Thus, they are more susceptible to theft. Therefore, always secure the wheels with a lock when you park your tricycle. It is also possible to exchange the quick releases with special security screws (e.g. from PITLOCK) that can only be opened with a special tool. For this please consult your local specialist dealer.

Danger! Check the proper setting of quick release levers always before riding, especially when the bicycle has been unattended.

The first miles

The first 300 km (186 miles) are an important for breaking in the tricycle. During the first use of a new tricycle the screws may settle and become loose. Cables and spokes may stretch. Bearings may show play. Please be very attentive during that period.

After 300 km or after two months at the latest you will have to take your tricycle to a bicycle mechanic for the first service. Please record this first service and the works performed in the warranty pass on page 98. This first service is the prerequisite for further use of the tricycle and for your warranty claims.

Safety instructions (bicycle)

Legal requirements

When you ride your tricycle on public roads it must comply with national legislation and guidelines. They vary from country to country.

In general, there are minimum standards for brakes, reflectors and lighting systems, as well as usually a general duty to ensure that your vehicle is in roadworthy safe condition. There will also be a duty to ride in a safe and responsible manner. If you ride your HP VELOTECHNIK tricycle in traffic you should be sure to observe all the applicable laws and regulations.

In most countries, including Germany and the UK, two independent braking systems are required. Do not ride with only one brake working! Please contact your local dealer to find out about your legal obligations.

As an addition, we recommend to mount a flag on a pole for better visibility in traffic. You can find a bracket for the pole at the rear rack or the rear light mount.

The safety equipment on your tricycle must be checked before every ride and maintained in proper condition.

Traffic regulations may change. Please check currently valid regulations or ask your specialist dealer.

Work on the Trike

Attention! Your recumbent has moving parts. Your fingers or other body parts can be injured by moving parts. During adjustment, maintenance and repair work, make sure that your recumbent is standing securely and be careful while working.

Danger! When adjusting, maintaining or repairing the drivetrain, especially when fitting or removing the chain, it is essential to disengage the motor system. If the motor system is switched on, movement of the pedals or the pedal crank may cause the motor support to start up suddenly, resulting in movement in the drivetrain. Fingers or other parts of the body may be crushed or otherwise injured by moving parts.

No alteration of parts

Attention! You are not allowed to perform any work on the parts of the tricycle, especially frame, fork, handlebar and seat, which might endanger their solidity.

These works include drilling holes, welding, brazing, paint methods that add heat or any other chemical treatment. If any of these works is done improperly it may result in a loss of strength by direct damage or increased susceptibility to corrosion.

Frame number and identification marks

The frame number is placed on the positions described below depending on the model.

If needed, an additional identification mark can be engraved on the head tubes or, depending on the model, at the positions described below.

However, we recommend to use adhesive stickers for additional identification numbers.

Gekko 26



The frame number is engraved on the right head tube. For an additional identification mark the left head tube can be used.

Gekko fx 20, Gekko fx 26

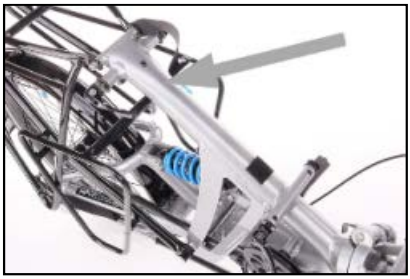


On Gekko fx 20 and Gekko fx 26 frames the frame number is placed on the cross tubes gusset sheet. The identification mark can be engraved there as well.

Scorpion/ fx20 /fx26, Scorpion fs 26 /fs 26 Enduro/ fs 26 S-Pedelec / plus 20 / plus 26



The frame number is placed on the inner side of the gusset plate.



For additional identification marks use the area below the cable guidance on the upper side of the seat tube.

Scorpion fs 20



On Scorpion fs 20 and Scorpion fx use the lower stay on the right side of the gusset sheet for identification marks, as like the position of the frame number on the other side.

Added parts and accessories

⚠ **Attention!** Mounting additional parts or accessories is at your own risk. It is important that you carefully read the installation guide of the manufacturer. Additions to the handlebar like fairings, handlebar fittings, bottle holders, etc. may impair your safety due to additional loading or clips with sharp edges.

Additional accessories may impair the function of your recumbent tricycle. We advise you to generally ask your dealer before you mount any special parts or accessories to your tricycle.

Take care that the handlebar, the wheels, the suspension and the folding mechanism always stay moveable. You must not add any parts to the handlebar or the seat that might endanger the rider through sharp edged or pointed shapes while steering, getting on and off the tricycle or bumping against something.

Before you purchase a bell or a lighting system make sure that these accessories conform to your national laws and regulations (see also the chapter "Lighting system" on page 49).

Additional accessories may invalidate the operating licence or impair the function of your S-Pedelec. Check the special safety instructions for the S-Pedelec on page 21.

Fairings

As a front fairing for recumbent tricycle, you may use the Streamer fairing offered by HP VELOTECHNIK. Please take care to assure a good vision over the fairing and sufficient freedom of movement below.

Please take into account that any fairing makes the tricycle more prone to crosswind influences. In strong wind or gusts of wind unsafe situations may occur. Please remove the fairing before riding in such weather conditions.



Front fairing "Streamer"on the Scorpion tricycle

Taking children with you

HP VELOTECHNIK tricycles are not designed for the transport of children. You are not allowed to mount a child's seat.

To take children with you, you can use a trailer that has been specially designed for that purpose.

Trailer

Read the manual of the trailer manufactuerer carefully an check for speed regualtions, maximum load cpacity as well as regulations for trailers on publics streets in you country or state.

Remember that your bicycle is longer when carrying a trailer, and riding behaviour is different due to the additional weight.

Make sure you can ride your bicycle safely and feel comfortable with the behavior in a safe area before riding in public traffic.

Scorpion, Scorpion fx20 /fx26, Scorpion fs 26, Scorpion fs 26 Enduro, Scorpion plus 20, Scorpion plus 26

You are allowed to use trailers (double trail only) up to 40 kg (88 lbs).

We recommend using a trailer hitch mounted to the rear dropout. Please make sure the maximum allowed load on the trailer hitch is not exceeded.

Always check that the suspension and the trailer still work properly after you have mounted the trailer.

When using pedelec systems, you may need special accessories from HP VELOTECHNIK to mount the trailer coupling.

Scorpion fs 20

You are allowed to use trailers (double trail only) up to 40 kg (88 lbs). When using a rear

rack, you will need our special HP VELOTECHNIK / WEBER coupling.

Please make sure the maximum allowed load on the trailer hitch is not exceeded.

WEBER offers a special, lowered coupling for CHARIOT trailers on 20 inch rear wheels.

Always check that the suspension and the trailer still work properly after you have mounted the trailer.

When using pedelec systems, you may need special accessories from HP VELOTECHNIK to mount the trailer coupling.

Gekko fx 20, Gekko fx 26, Gekko 26

You are allowed to use trailers (double trail only) up to 40 kg (88 lbs). When using a rear hub motor, you will need our special HP VELOTECHNIK / WEBER coupling.

Please make sure the maximum allowed load on the trailer hitch is not exceeded.

WEBER offers a special, lowered coupling for CHARIOT trailers on 20 inch rear wheels.

Replacement of parts

The replacement of parts relevant for safety (especially brakes, lighting system, stem, handlebar, knuckles, drive train, suspension elements) should only be done with original parts by a bicycle mechanic, since it requires a certain degree of skill, suitable tools and mechanical aptitude.

Any technical change you perform on your own is at your own risk! The warranty claim may expire.

Danger! If any part is deformed (e.g. due to an accident or overload), especially frame, knuckles, handlebar, seat mountings, pedals, cranks and brakes, it is not allowed to use it any further or repair it. Do not try to straighten bent parts. You must replace them for your own safety. If you do not replace a damaged part it can result in a total failure of the part and you may be seriously injured!

Replacement of parts on pedelecs

Electric assist drives are carefully tested by HP VELOTECHNIK before they are fitted to HP VELOTECHNIK recumbents and sold. Chain forces are part of the test. Chain forces are determined in particular by the electric assist drive itself and the chainrings fitted.

It is not permitted to install other electric assist systems than those expressly approved by HP VELOTECHNIK for the respective vehicle model.

Danger! HP VELOTECHNIK recumbents may be damaged by the use of drive components not approved by HP VELOTECHNIK. This damage may result in an accident, personal injury or death. Under no circumstances must the drive components used lead to higher chain forces than those caused by the components originally installed by HP VELOTECHNIK.

All journeys

Handling

The bicycle has moving parts and adjustments. There is a risk of fingers or other parts of the body being caught. Exercise caution when handling, adjusting, servicing and riding.

Safety instructions (bicycle)

Parking

When parking your tricycle, always secure it with the parking brake to prevent it from rolling away.

Routes and weather conditions

When planning your route, remember that your tricycle is wider than a wheelchair.

Be aware of the influence of the weather and a wet or slippery road surface on riding safety. HP VELOTECHNIK recommends that you do not ride in icy conditions.

Only drive on paved roads.

There is a risk of overturning if the motorcycle is tilted sideways, e.g. on slopes. Therefore, avoid riding on roads with steep side slopes.

Ride over low obstacles only, always forward and at low speed. Only use lowered kerbs, e.g. when driving on or over a pavement.

Note that wheel parts can become very hot in strong sunlight.

Riding style

Ride at an appropriate speed. HP VELOTECHNIK recommends that you always ride with your lights on.

Always be ready to brake.

The parking brake is not an operating brake. It must not be used to brake while riding.

Multiple users

Your tricycle must be adapted for use by other people before it is used by them. Check whether the adjustments need to be carried out by qualified personnel.

Give the owner's manual to each user before the first ride. Each user must familiarise themselves with the tricycle as described above.

Carrying the recumbent

The recumbent must not be lifted with a person on the seat.

Breakdowns

Before every ride, plan how you will react in the event of a breakdown. A puncture can be caused, for example, by a flat tyre or a broken chain, making it impossible to continue riding without repairs. If you cannot get around without your bike, ride with an escort. If you want to rely on the ability to call for help on your mobile phone

Breakdowns

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Lights and indicators

If the motorcycle is equipped with an electric drive system, the lights and the optional indicators will only work when the electric drive system is switched on.

Service life

Taking into account the owner's manual, the frequency of use, regular and correct maintenance and correct use, the expected service life is 8 years.

Electric assist systems

Danger! Please be sure to follow the drive manufacturer's instructions before putting the system into operation!

Safety instructions (bicycle)

HP VELOTECHNIK offers electric assistance system for your recumbent bicycle. Please follow the instructions in the manuals of the electric assistance system manufacturer.
The installation of and operation with an electric assist system not expressly approved by HP VELOTECHNIK for the respective model is not permitted.

⚠ **Danger!** HP VELOTECHNIK recumbents can be damaged by the use of drivetrain components not approved by HP VELOTECHNIK. For example, frame breakage may occur.This damage can lead to accidents with injuries or even death. Under no circumstances must the used components of the drivetrain lead to higher chain forces other than specified by components originally installed by HP VELOTECHNIK.

HP VELOTECHNIK expressly refers to the consequences described in the user manual by the installation of non-approved components on the warranty - this can be found next to the inspection certificates.

⚠ **Danger!** Chargers and rechargeable batteries can explode, burn, generate smoke or cause an electric shock if handled incorrectly during the charging process; corrosive liquid can escape from rechargeable batteries.
This can lead to property damage and injuries or even death.
Observe the following **precautions** to avoid this:
1. Be sure to observe the original operating instructions for charger and rechargeable battery.
2. Keep the instructions. Make the instructions available to any other user.
3. Do not ship a rechargeable battery, as rechargeable batteries must be handled separately as hazardous goods. In case of complaints, contact your specialist dealer.
4. Do not open, damage or repair the charger or the rechargeable battery.
5. Protect the charger and battery from heat, e.g. from strong sunlight or radiators.

Pay attention when charging:
1. Only use intact charger and rechargable batteries.
2. Only use the specified charger for charging.
3. Choose an indoor location that is ventilated, dry, dust-free, and has a smoke detector.
4. Place the charger and the rechargeable battery on a fireproof surface when charging.
5. The charger, rechargeable battery and plug must not be in a damp or even wet state. Also check the contacts of the rechargeable battery.
Moisture must not be allowed to condense on the rechargeable battery.
6. Do not cover charger and rechargeable battery with textiles or flammable material.
7. Children and people with reduced physical, sensory or mental capabilities are not allowed to charge a rechargeable battery.
8. Do not allow children to play in the vicinity.
9. Charge the rechargeable battery only under supervision.

Safety instructions (bicycle)

Behavior in case of pollutant leakage, heat development, flames

Liquid is leaking from the battery:
• Immediately disconnect the charger from the socket.
• Immediately stop using the battery.
• Protect eyes, skin and textiles from leaking liquid. If liquid from the battery has entered eyes, rinse them immediately with plenty of water, do not rub, then consult a doctor.
• If liquid has got onto skin or textiles, rinse with plenty of water.

Smoke or fumes are coming out of the battery:
• Immediately disconnect the charger from the socket.
• Immediately stop using the battery.
• Avoid inhaling smoke or fumes.

Heat development or flames:
• Immediately disconnect the charger from the socket.
• Immediately stop using the battery.
• In case of fire, take appropriate measures.

Please note that every battery loses capacity over time, i.e. it becomes weaker. This normal battery wear and tear is influenced by factors such as use, number of charge cycles and ambient temperature, and the capacity will also decrease if the battery is not used. A weaker battery can still be used, but will reduce the range of your electric drive.

If you are not going to use your bike for a long period of time, disconnect the battery from the bike to prevent it from discharging any connected electrical components. Store and use the battery at a temperature between 5 and 20 degrees Celsius.

If you do not charge your battery for several weeks, the battery may reach a state of deep discharge due to self-discharge. This can permanently damage the battery. Deep-discharged batteries are not covered by warranty or guarantee.

Smartphone apps are available for some drive systems that allow you to change settings. Use these apps only when stationary, not while driving. Changing the settings can significantly change the driving behaviour, so you must familiarise yourself with the new driving behaviour by driving slowly in a safe, traffic-free environment after a change. In many countries it is illegal to use a smartphone while driving, especially if you are holding it in your hand.

Safety instructions (S-Pedelec)

Legal requirements

⚠ **Attention!** The legal situation described below is valid for Germany only. For legal requirements in your country, please contact the authorities.

According to law, the Scorpion fs 26 S-Pedelec is not a bicycle but a motor vehicle class L2e (three-wheeled small motorcycles with a maximum design speed up to 45 km/h). With additional power from the rider's muscles, up to 45 km/h can be reached. At that speed, the motor assistance is switched of completely.

You have received an EU Certificate of Conformity (CoC) with your S-Pedelec. This lists technical details and confirms the compliance of the vehicle with EU standards and directives.

In Germany, to be allowed to use the S-Pedelec on public roads, there must be an operating licence for it and it must be equipped with an valid insurance plate. The keeper of the Scorpion fs 26 S-Pedelec must contract a motor vehicle liability insurance and will receive an insurance plate in doing so. The rider always has to carry the insurance card while riding.

Please check current regulations in your country regarding driver's license requirements, use of bike lanes, riding off-road, wearing helmets, etc. before operating.

Exchanging parts

Exchanging parts may invalidate the operating licence of your S-Pedelec. When issuing the operating licence some parts are defined that can only be exchanged by parts identical in construction. Such are: frame parts, chassis parts, wheels, propulsion unit: motor, accumulator, console, brakes, lighting system, handlebars, stem, console for insurance plate and rear light and license plate illumination.

Some components are subject to approval. Such are: tires, rear mirror. They may only be replaced with other type-tested components that bear an E mark. The components must also always comply with the specification in the EU Certificate of Conformity (CoC).

The following parts may be exchanged by parts recommended for the Scorpion fs 26 S-Pedelec by HP VELOTECHNIK: springs and dampers, brake pads, fenders, seat (BodyLink to ErgoMesh or ErgoMesh XL and vice versa, not ErgoMesh HS or BodyLink with long seat connection sheets)

Parts with no exchange restrictions are the following: gearing system, chain rings, sprockets., cranks, pedals (with reflectors incl. design approval), grips, tubes

Added parts and accessories

Additional accessories may invalidate the operating licence or impair the function of your S-Pedelec. This may also be valid for accessories and parts that are not in the category of parts that can only be exchanged with parts identical in construction. Before mounting parts and accessories, it is recommended to contact your bicycle dealer or a vehicle examination organisation (like TÜV, Dekra, GTÜ).

Fairings

As a front fairing for Scorpion fs 26 S-Pedelec you may use the Streamer fairing offered by HP VELOTECHNIK. Please take care to assure a good vision over the fairing and sufficient free-

dom of movement below. Please take into account that any fairing makes the tricycle more prone to crosswind influences. In strong wind or gusts of wind unsafe situations may occur. Please remove the fairing before riding in such weather conditions.



No alteration of parts

These works include drilling holes, welding, brazing, paint methods that add heat or any other chemical treatment. If any of these works is done improperly it may result in a loss of strength by direct damage or increased susceptibility to corrosion.

Taking children with you

The transport of children with the Scorpion fs 26 S-Pedelec is not allowed.
You are not allowed to mount a child's seat.

Trailers

Towing a trailer is not allowed.

Factory plate and tire pressure label

The factory plate contains the most important information about the vehicle and manufacturer. It is located on the left side of the frame behind the folding hinge. The factory plate must not be removed under any circumstances!

The tire pressure label is also located on the left side of the frame behind the folding hinge. It contains the following information: tire size (e. g. 47-406), speed index (e.g. B), rim width (e. g. 17C), recommended tire pressure at full load in kPa and bar

VIN (Vehicle Identification Number) and frame number.

The FIN is the official number of the S-Pedelec. It is located on the right side on the gusset plate.



The frame number is located on the inside of the gusset plate. It has no official meaning, but serves internal company purposes.

Additional identification number

An additional identification number shouldn't be engraved on the S-Pedelec.

S-Pedelec system

Instructions for the use and safety of the S-Pedelec systems are referred in the systems manufacturer's manuals. Please read them carefully before use.

No riding without accumulator

According to the regulations in your country, it might not be allowed to ride the Scorpion fs 26 S-Pedelec without a properly charged accumulator installed. The accumulator provides electric energy for lighting system and brake light. Without accumulator, these features will not work.

Riding a recumbent tricycle

Learning the new riding technique

Your new tricycle has been assembled by your dealer and adjusted together with you as described on the pages 26 and following in the chapter "Adjusting your new tricycle". Before you sit down on your tricycle and enjoy your first ride please make yourself familiar with the instructions on riding technique and handling.

To ride this recumbent, you will have to make yourself acquainted with the different riding position. Make sure that you and all other future users of this tricycle will have read this manual carefully prior to the first ride. If you are in doubt, please consult your local dealer.

Before the first ride the users of this recumbent have to practice and make themselves familiar with the different handling. We recommend to practice on a quiet road away from traffic. Before you ride the tricycle in traffic you must master the handling completely.

Keep all three wheels on the ground while riding. If you are cornering too fast, your tricycle can be upset and fall over. Lean into curves when turning sharply. At high speed, keep your upper body quiet as any upper body movements can influence the steering of the tricycle.

⚠ **Attention**! When getting on and off the tricycle, make sure to avoid pulling at the handle bars or stepping on the tie rods. To get off the tricycle, sit upright on the front seat edge and then stand up. Grip the front wheels or the seat back as extra support, not the handlebars. If you pull firmly at the handlebars, the steering can be damaged.

⚠ **Danger!** Never touch the ground with your feet while the tricycle is still moving. The feet could be caught on the ground and be pulled backwards and dragged under the cross bar which could lead to a serious injury. We strongly recommend using a pedal binding system like clipless pedals (see p. 24) or toe clips and straps.

Practice cornering away from traffic to learn what speed is safe at a specific turning angle. If you lift up a front wheel, immediately steer in the opposite direction to bring it safely back to the ground.

⚠ **Danger!** Please be aware that due to your low seat height other road users may notice you very late. Ride anticipatory with this in mind.

This is especially important while riding in darkness. You yourself have a much better view than others perceive you. Ride defensively. We recommend mounting a well visible and reflecting flag to the tricycle while using it in traffic. Find more information about lighting systems on page 49. Please ask your dealer for more information.

Before every ride

Check before every ride:

- bell, lights and, if mounted, indicator lights must be working and properly fixed
- brakes must work correctly, brake levers must be properly fixed
- on hydraulic brakes, make sure that there is no leakage on the brake hose
- wheels must be in a good condition. Tires pumped up well, rims must be trued up correctly and there must be a good profile on the tires and no damage

- suspension parts must be properly fixed and well working
- all bolts, nuts and quick releases must be fixed tightly, check also after leaving your bike alone for a short while
- no deformation and damage on the frame parts or fork
- handlebars, stem, and seat must be fixed and in the correct position
- pull out the key of the frame lock (optional equipment). It may come loose due to vibrations while driving

How to ride correctly and safely

Attention! Always carry your tricycle over stairs and curb stones. Do not ride through big road holes. Especially when road holes are filled with water it is very difficult to guess how deep they really are.

In case you hit such an obstacle, frame and steering may be damaged which can result in a serious fall. At first, the damage may be unnoticed. Please check your tricycle immediately for deformations and cracks. If you are in doubt, please consult your local dealer.

Do not ride freehand

Danger! In order to ride safely you have to keep both hands at the handlebar. Even when signalling keep at least one hand at the handlebar. Otherwise, unforeseen bumps in the road or oscillations of the steering may lead to a serious fall.

How to ride correctly and safely

Always adjust your speed to the traffic, the road and the weather conditions. Ride slowly in curves and on unknown roads. Always ride at a safe distance from other road users, and when you ride in a group never ride side by side.

When you approach a traffic light never ride past the line of waiting cars since even the most attentive car driver may not see you due to your low riding position.

When riding the S-Pedelec, be aware of the higher speed level this vehicle provides. It may be unfamiliar for other people in traffic. Ride defensively. Only ride at higher speeds where and when this is safe!

Wear protective clothing

Riding a tricycle is a potentially dangerous sport where accidents can happen even when you take care of every safety instruction prescribed.

We recommend you to wear an approved bicycle helmet that fits well. Protect yourself by wearing special sports clothing that fits tight and is reflective. If you're wearing wide pants use clips to protect them from getting caught in the chain – or use an old fashioned method and put the pants in your sockets.

When you fall with a recumbent you'll usually land on the side of your hips and your hands. Wearing reinforced cycling shorts and gloves reduces the danger of skin injuries considerably.

Use clipless pedals

The pedals of your recumbent tricycle can be upgraded on demand with a binding system. As soon as you are comfortable with riding your Scorpion you should use those clipless pedals. Due to the rigid connection between shoe and pedal you don't have to keep your foot on the pedals with pressure anymore. This enables a more relaxed and round pedalling movement where you may even pull a little on the pedals. Without this connection to the pedals your feet may come off suddenly

which may result in a fall. Modern system pedals with binding therefore contribute to safe riding.

At first you will have to practice with these pedals to make sure that you can get off quickly in a dangerous situation. Please read the manual of the pedal manufacturer that comes with this manual and have your dealer explain the use of the pedals to you. In the beginning set the release force of the binding to a low value to make sure you can get off safely.

Please use exclusively the original shoe plates / cleats from the manufacturer of the pedals, do not use any other brand. If you're using shoe plates that are not authorised the binding system won't work properly.

Slowly increase the strain

We recommend you to perform only short rides without much power during the first weeks.

Always use a low gear and ride with a high pedalling frequency. Only after having acquired some training do increase the strain slowly.

When you ride on a recumbent you use different muscles than on a conventional bicycle, and they have to be trained first. The very high position of the bottom bracket requires your muscles and blood transport system to slowly familiarise with the new position.

In case of an overload the blood circulation in your legs may be affected which shows in loss of power, a prickling in the toes, falling asleep of the legs or cramps. When you feature a sporty way of riding it can take up to 6 months until you have become accustomed to your new recumbent.

If there is pain in your knees occurring while riding this is usually the result of too much power put into pedalling. The good support of the back sometimes misleads to putting the full power of the legs in the pedal, similar to the leg training machines in a fitness centre. When you repeat it regularly it is harmful for the knees. Pain in the knees often results from an overuse of the muscles in the knee that can also be strengthened by exercise.

Also, a wrong adjustment of the front boom to the leg length (in most cases too short) can lead to pain in the knees.

Adjusting your new tricycle

Your position on the recumbent bicycle is essential for your riding comfort, well-being and efficient cycling. Therefore, you should adjust the frame, seat, handlebar and suspension to your individual requirements.

If your tricycle is equipped with the optional front boom-quick adjust, please read the instructions in the separate manual in addition to the following instructions.

In order to adapt the bicycle as closely as possible to your body dimensions and to find your ideal position you need to adjust the front boom, seat and handlebars.

Danger! All procedures described here require a certain degree of skill, suitable tools and mechanical aptitude. After any adjustment perform a static check and take a test ride on a quiet street, away from traffic. If you have any doubts, please contact your local dealer.

Adjusting the seat position

For all Scorpion models, there are two alternative Seats available: The BodyLink-seat and the ErgoMesh seat. In the following, the detailed setting options for both seats are described. On page 40 you will find more information about taking off the seat.

On the Gekko models, the seat is integrated into the frame and remains on the tricycle.

The BodyLink-seat

The BodyLink seat allows adjustment of length, seat back angle and lower seat angle. The adjustment of the seat length and the proper seat angle is crucial for a comfortable feeling while riding your recumbent.

The upper curve of the seat back in the area of the shoulder blades determines the correct seat length: Through this shape the shoulder and neck area is lifted from the recumbent position so that the head rests in a natural and relaxed position. For this reason, you should not need a head rest if you have the right seat position. On long rides, a head rest can increase your riding comfort as you can relax your neck for a few seconds by leaning back. You can mount our custom headrest to your existing seat.

The seat is too small when you have the impression that your back is pressed too much into a "hunchback". It is too large when you have the impression that the seat angle is too far leaned back when you are in the most upright position, or when you hit the upper seat edge with the back of your head when you look upwards.



Seat adjustment on tricycles with BodyLink-seats

Adjusting the seat length

Take off the seat cover (see page 28). Open the quick release lever for the seat back angle adjustment, so that the seat is not bent with inner tension. Loosen the 4 screws at the inner side of the seat back with an Allen key size 4 a few turns.

Adjusting your new tricycle

Step behind your tricycle and hold the seat back with both hands. Pull or push the seat back to achieve the preferred seat length.

To achieve the smallest possible seat length, move the 2 upper screws from the top to the middle holes.

Tighten all 4 screws with 5 – 6 Nm. Move the seat back rest to the preferred angle and close the quick release lever firmly. Reinstall the seat cover

⚠ **Attention**! Do not loosen or tighten the 4 screws in the lower seat part to adjust the seat length. Maximum tightening torque of these screws is 3 – 4 Nm.

⚠ **Attention!** To avoid noise from the seat when loaded, the contact surfaces between the two seat shells need to be separated by self-adhesive plastic sheets and all contact surfaces of seat and seat mountings and frame need to be lubricated with grease.

Length adjustment of the Airflow cushion

The optional Airflow-cushion consists of two parts that connect in a V-type shape. Loosen the Velcro mounting of the upper part, and place it in the desired position, then fasten the Velcro.

Adjusting the seat back angle

A great advantage of the BodyLink seat on your recumbent tricycle is the possibility to adjust the seat back angle very quickly. For beginners or rides in the city you can choose an upright seat position for a better view, and for longer rides you can choose a flat position for better aerodynamics.

The seat back is fastened with a quick release lever on a slotted aluminium seat mounting.

You can adjust the seat back angle by 10 degrees by simply opening the quick release lever. In the medium seat position, the angle is about 35° from horizontal.

Adjusting the seat back angle is easy when you push the seat back with your hands on the backside close to the seat mounting into the desired position.

By pulling at the upper seat edge, tension may be created which causes the adjustment mechanism to lock up.

Adjusting the front seat edge

The front seat edge can be slightly lowered to accommodate smaller riders. With a lower front seat edge, it is easier to put your feet on the ground without pressure from the seat edge on the back of your legs. With a higher front seat edge, the seat will give more support and avoid the feeling of „sliding down the seat“ that occurs with upright seat angles.

To adjust the front seat edge, open the quick release lever at both the lower and the upper seat half, so that the seat is not under inner tension. Thus you need less force for the adjustment. Push or pull the seat front edge firmly to reach the desired position and close the quick release lever firmly. Then adjust the seat back angle as described above.

If the quick release lever pressure is too loose when closed, open the lever and turn the screw on the end of the quick release axle clockwise. The low profile design of the screw head gives more clearance for the drive train. Please pay attention to the instructions about quick release levers page 12.

Adjusting the lumbar support

The BodyLink seat is ergonomically shaped and supports the natural S-curve of your spine. Forces from pedalling are supported in the area of your lower back just above your

hips. The amount of support in this area (lumbar support) is adjustable by moving the seat back and lower seat against each other.

To get more lumbar support, lower the seat front edge and put the seat back in a more reclined position. To get less lumbar support, rise the front seat edge and put the seat back more upright.

For maximum adjustment, loosen the 4 screws for the seat length adjustment in the seat back. Thus the lobes of the lower seat part can move more easily into the desired shape. Tighten the screws and quick releases as described above.

Attention! The three quick releases have to be closed firmly (tightening force 15-20 kg / 45 lbs) to safely hold the seat. You must not open them while riding. After they have been closed the imprint "close" must be visible. If the quick releases are not properly tightened the seat can move while riding and you may lose control over your tricycle.
Please pay attention to the instructions about quick release levers on page 12.

Seat cushion

The standard seat cushion consists of a 1,4 cm thick layer of flexible EVA foam. This is a black foam material with closed cells that is also used in the production of high quality camping mats. It feels very comfortable without appearing too soft or spongy. It is waterproof so you can dry your seat with a sweep of your hand in case your bicycle has become wet.

Attention! The seat cushion is fastened with Velcro and you can take it off. For this purpose, it is important not to simply grab the foam and take it off since the Velcro could come off.

In order to take off the seat cushion lift up the upper part a little bit from the seat. Then you grab the cushion on both sides together with the end of the Velcro that sticks out slightly and remove the cushion slowly. In case the Velcro comes off fasten it again with a good glue.

Attention! Never expose the seat cushion to extreme heat or focused sunlight. The material warms up considerably. The heat may melt the glue of the Velcro. The seat cushion can be damaged when the rays of the sun are bundled through a lens. Take care to never leave any bubble wrap on the seat in the sun. The air bubbles in the film act like a burning glass and shrink the seat cushion.

For better ventilation, the Airflow Cushion is available as accessory. This cushion consists of several layers: A rigid mesh and a soft mesh, which provides for an approximately 1 cm thick air cushion with excellent circulation. These two layers are wrapped up in a cover that consists of fine mesh like it is known from high quality rucksacks.

The seat cushion suffers from wear by constant use. The mesh parts under punctual pressure can be pressed together permanently after some time of usage. In order to still provide a good riding comfort, the Airflow Cushion features additional rigid mesh padding.

Adjusting your new tricycle

The ErgoMesh seat

The ErgoMesh seat is ergonomically shaped and supports the natural S-curve of your spine. Forces from pedalling are supported in the area of your lower back just above your hips (lumbar support).

Eight tension belts on the back side of the seat allow the adjustment of the seatnet to your needs.

Does the seat feel too soft or gives you the feeling of sitting on the seat frame, increase the tension of the belts on the back side of the seat.

Is it hard or uncomfortable, or do you feel like slipping off when going through curves, release the belts in the relating area.

It may be necessary to put a high force on the belts to apply sufficient tension to the belts. If it can not be done by hand, make use of a flat nose pliers and pull the lose end of the belts firmly. To easily loosen the belt, pull up the round end of the strap retainer.

The angle of all ErgoMesh-seats can be adjusted. Loosen the upper and the lower quick-release lever – the middle lever should remain closed.

Move the seat into the desired angle. Then close the upper and lower quick-release lever, regarding the sheets are completely covered by the hole diameter of the clamping surface.

To adapt the tricycle perfectly to your needs, we offer the following versions of the ErgoMesh-Seat besides the standard version.

The ErgoMesh XL-versions

All ErgoMesh-seats are available as XL version. These are 3 cm longer and 5 cm wider than the standard versions. They are meant to give strongly build persons a comfortable seat option.

The ErgoMesh HS versions

The ErgoMesh HS seats have been designed to simplify getting on and off the tricycle. With a plus of 11 cm seat height compared to the ErgoMesh-standard seats, they give you a better overview in traffic.



Attention! When using the ErgoMesh HS seats, be careful when riding through bends. Due to the increased height the tricycle may tend to tip over easily.

You can wash the seat nets of the ErgoMesh seats by hand using a gentle detergent. Do not wash them in the washing machine.

The ErgoMesh Premium seat



ErgoMesh Premium seat folded:
1 - seat connection sheet of the backrest
2 - middle seat connection sheet

3 - front seat connection sheet

Mounting and Adjustment

The seat is attached to the recumbent frame with quick releases on the 3 seat mounting tubes.
First fold the seat and insert it on the middle seat mounting tube, then insert it on the front seat mounting tube and tighten both quick releases.

Next, slide in the backrest seat connection sheet on the top seat mounting tube. The seat connection sheet must be aligned so that the groove fits neatly onto the quick release. Then tighten the quick release.

To adjust the backrest, only the upper quick release needs be loosened. To adjust the seat, both lower quick releases must be loosened.

Important: When installing the seat for the first time, check the clearance between chain roller and the middle seat connection sheet over the entire adjustment range. If the middle seat connection sheet touches the chain roller, the chain roller must be turned over. The logo of the chain roller is then on the inside. Therefore note the instructions on page 59ff.

Taking off the seat

Both ErgoMesh and BodyLink seat can be removed from the bicycle without tools.

Open all three quick release levers of the seat mountings: Unscrew the nut of the upper seat quick release approximately 4 turns. Turn the quick release levers of the middle and lower seat quick release counter clockwise approximately 4 turns.

With a water bottle mounting installed, space is limited and it may be easier to hold the quick release lever and turn the flat nut on the right side (chain side) of the seat mountings with a 5 mm Allen key.

⚠ Attention! When storing the seat, please take care not to bend or break the seat mountings. Protect the edges of the seat mountings with padding to avoid scratching other objects with the seat mountings.

The Gekko meshseat

The Gekko models are equipped with a mesh seat which needs not to be removed for folding the tricycle. Using eight straps, the seat surface can be adjusted individually to your back. The backrest angle is fully adjustable with a quick release. The seat is ergonomically shaped and supports the natural S-curve of your spine. Forces from pedalling are supported in the area of your lower back just above your hips. The seat is bowed up in this area (lumbar support).

The adjustment of the seat mesh and the proper seat angle is crucial for a comfortable feeling while riding your recumbent.



The meshseat on Gekko models remains on the tricycle when folding

Adjusting the seat mesh

By means of eight straps on the backside and underside of the seat frame the tension of the

seat mesh can be adjusted according to your needs.

If the seat feels too soft, you sink in too far at one spot or you sit on the seat frame you'll have to tighten the straps in that area.

If there is some spot where the seat feels too hard and uncomfortable or you don't have enough lateral support you'll have to loosen the straps in the respective area.

You can use gripping pliers to tighten the straps in case the force you can apply with your hand is not enough. To loosen a strap, the semi-circular side of the plastic connector must be lifted to release the strap out of the connector.

Adjusting the seat back angle

A great advantage of the mesh seat on your Gekko is the possibility to adjust the seat back angle very quickly. For beginners or rides in the city you can choose an upright seat position for a better view, and for longer rides you can choose a flat position for better aerodynamics. The seat back is fastened with a quick release lever on a slotted aluminium seat mounting. You can adjust the seat back angle by 8 degrees by simply opening the quick release lever. In the medium seat position, the angle is about 38° from horizontal. Having set up your desired seat back angle close the quick release tightly to make sure the seat back will not move during the ride.

⚠ **Attention!** Always close the quick release at the seat back tightly. The seat is a structural part of the tricycle frame. An opened quick release may lead to frame damage.
Please pay attention to the instructions about quick release levers page 12.

Cleaning

All seat covers, including the seat belts, can be cleaned by hand using a gentle detergent. Do not wash the seat covers in the washing machine. Allow them to air dry. Do not tumble dry them.

The headrest

Both seat types can be equipped with a head / neck rest. Its height and inclination is adjustable at the clamp. Use the long holes and the screw hidden under the cushion (BodyLink-seat) or the mounting clamp (ErgoMesh- and Gekko-seat) for setting up the correct position.

⚠ **Attention!** Do not push or carry your tricycle on the head rest, this may damage the head rest or the seat!

Raincover

To keep the seat dry when your tricycle is parked you can additionally purchase a raincover. It can be carried in the optional Microbag or in the bag the ErgoMesh seat is equipped standard with.

In order to firmly secure the raincover to the Gekko mesh-seats, there are two plastic clamps on the underside of the most forward strap of the seat. The raincover can be hooked into these clamps.

⚠ **Attention!** Don't sit down on the raincover. It may get damaged.

Adjusting to your size

Adjusting the front boom

In order to adjust the leg length, you have to move the front boom (the front part of the frame where the cranks are mounted) in the main frame.



Loosen the bolts to adjust the front boom.

Unscrew the bolts M8x35 under the main tube with a 6 mm Allen key. Take a grip on the front derailleur tube or both cranks and move the front boom further into the frame or pull it out while cautiously turning it.

Before you pull out the front boom shift the chain to the smallest chain ring and sprocket. Turn the cranks a little bit backwards while pulling. Thus the chain is not under tension.

Attention! After you have unscrewed the clamping bolts take them off and examine them for deformation. Lubricate threads and heads thoroughly. Then re-fit the bolts. If they don't turn easily you will have to replace the bolts.

Adjust the front boom in a way that your leg is fully extended when your heel (wearing flat shoes) is in the foremost position on the pedal. Experience shows that the pedal-to-seat distance on a recumbent can be slightly longer than on a conventional bicycle.

While you are pedalling, the ball of your foot should be positioned above the centre of the pedal axle.

It is important that your leg is not fully straightened when the crank is in the foremost position. If the distance is too long it is difficult to overcome this dead point, pedalling becomes uncomfortable and there is too much strain on the sinews of your feet and legs. If the distance is too short you may suffer from knee pain.

Danger! When you insert the front boom, the front boom and the inner wall of the tube must be totally free from grease, otherwise it will not clamp properly and may turn while you are riding. This can result in serious accidents.



Adjust the front boom so that your knee will not be fully straightened when pedalling.

Adjusting to your size

Attention! When you move the front boom take care that its end does not damage any cables or wires that possibly come out of the main frame (e.g. light cables or wires from the drive train). Please inform yourself about the length of the front boom on your tricycle before you do any work. While moving the front boom you also have to move the light cables. The light cable must never be stressed by pulling.

For riders with short leg length the front boom has to be cut by a bicycle mechanic, so it can be inserted maximum possible. It is important to trim the end of the tube neatly. The bare metal of the shortened tube end has to be protected against corrosion with a paint stick or wax spray.

The maximum insertion of the front boom is limited by possible heel cycle of the frame's cross bar, depending on the rider's shoe size. Please check before riding your tricycle that there is enough heel clearance. For shorter riders under 175 cm body height we recommend to use shorter cranks.

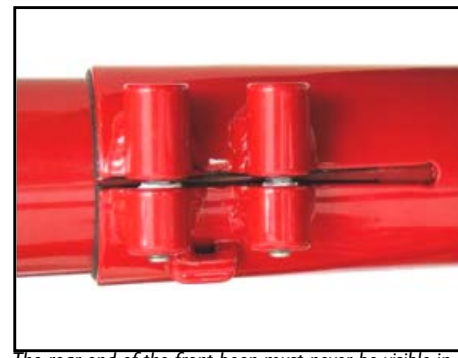
In order to align the front boom, you can look beyond the bottom bracket shell at the rear wheel axle and align the front boom parallel to it. Align your eyes with the bottom bracket axle and not the front derailleur tube. Then sit down on your tricycle and check the position.

On the left underside of the front boom, some models have a fine line. Align this line with the sticker on the main tube's front end right above the clamping bolts to adjust the bottom bracket axle to a horizontal position.



Mark on the front boom of the Scorpion fs 26

Attention! The minimum insertion depth of the front boom into the main frame is 8 cm (3,1"). The end of the front boom must not be visible in the clamping slot when you look at the main frame from below, since this may result in a damage of the frame.



The rear end of the front boon must never be visible in the clamping slot.

Tighten the bolts alternating in several steps with a torque wrench (tightening torque 11 – 12 Nm). On your first ride check whether there is sufficient clamping. Otherwise there is a risk that a single screw is overloaded and the frame gets damaged.

Adjusting to your size



The plastic bush between front boom and main frame must be visible at all time.

Danger! There must be a bushing (a slotted tube of plastic with edges to the front and the clamping slot) in the main frame's front boom hole that is glued in the frame. This bush ensures safe clamping of the front boom and protects the paint. It is important to take care that this bush is always visible at the front end of the main frame. The lower slot has to be aligned in coincidence with the slot in the main frame. If this bush is missing or moved to the back of the tube while inserting the front boom, safe clamping is no longer guaranteed, even if it seems to be the case at first glance. If the front boom is not clamped properly it may turn and lead to a fall. A missing or misaligned bush will lead to frame damage.

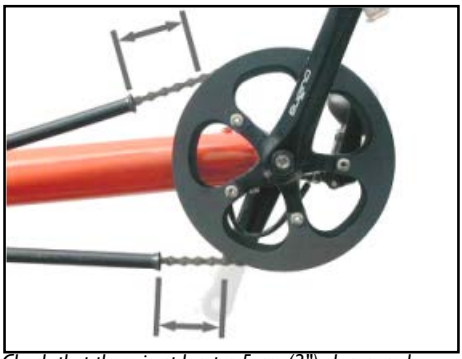
Danger! If the bolts are tightened too much or bent, the screw or the frame can break! If the clamping is insufficient the front boom can turn during a ride which may cause your feet to slip from the pedals and lead to injuries.

After moving the bottom bracket tube your dealer has to adjust the chain length. By default, your recumbent tricycle comes with a very long chain so the adjustment range of the tricycle can be fully used without the need to lengthen the chain.

After the basic adjustment of the leg length done by your dealer before handing over the tricycle, the chain has to be shortened so that the derailleur cage is not fully turned forward while shifting on the largest chain ring in front and the smallest sprocket behind. The derailleur must still be able to compensate a length change of the chain of at least 4 cm (1 1/2"). In order to choose the right chain length, please consult the manual of the derailleur manufacturer.

Danger! After the chain has been shortened it must be closed with a special closing link or a chain riveting tool that expands the rivet while riveting (i.e. ROHLOFF-Revolver). A poorly joined chain may break and thus lead to damage or injury. Chain length adjustments or chain changes should be done by your bicycle mechanic.

We recommend to slightly readjusting the front boom every 3 months in order to provide a slightly different position to your muscles and ankles. You might also find a more comfortable and more efficient riding position. A wrong adjustment may lead to pain in your knees and inefficient pedalling. In addition, we recommend riding with a high pedalling cadence, which means to pedal fast and with little pressure. Pedalling with too much pressure may also lead to pain in the knees. Read more about it in the chapter "Slowly increase the strain" on page 25.



Check that there is at least a 5 cm (2") clearance between the end of the chaintube and other parts of the drive train

Attention! Take care that the chain protection tubes have a clearance of at least 5 cm (2") to the rear derailleur and the front derailleur even under maximum tension of the chain and make sure that the tubes are held tight in their fastenings. The front upper tube can be moved to the rear for length adjustment. Shorten the tubes if necessary. If the end of the chaintube gets in touch with the rotating chain rings it can be locked-up and destroyed. The chaintubes must be prevented from moving by a rubber tube over the retention spring.

After adjusting the front boom, the gap in the clamping between the front boom and the main frame can be sealed with wax or silicone in order to protect your frame from the penetration of water and dirt.

Adjusting the length with front boom quick adjust

The front boom quick adjust is additional equipment for HP VELOTECHNIK recumbents that feature a telescopic front boom for leg length adjustment. It replaces the standard bolts of the front boom clamping by quick release levers. Two pulleys provide chain length compensation while moving the front boom.

The front boom must be clean and free from wax or tenacious remains of chain lube to make sure it can be easily slid in and out.

First, shift the chain to the largest chain ring and the largest sprocket to check the correct chain length.



Routing of the chain over the idlers of the front boom quick adjust

Open both quick release levers. Slide the front boom into the frame or pull it out until you've reached the required frame length.

To slide the front boom in, grip the cranks and turn them against the tensioned chain. The force on the chain helps to move the front boom into the frame tube.

To pull the front boom out, grip the derailleur tube if available. If you pull at the cranks, you'll have to turn them backwards at the same time, else the tensioned chain will balk the motion.

Adjusting to your size

Moving the front boom is easier when turning it a little bit from side to side. When doing this, make sure the pulley bracket doesn't scratch the frame and its lug won't be bent. That's why we recommend to only turn the front boom clockwise (and back afterwards) when looking from the front.

Adjust the length adjustable upper chain protection tube accordingly when sliding the front boom in or pulling it out. Take care that the chain protection tube has a clearance of at least 5 cm (2") to the other parts of the drive train.

Align the bottom bracket axis horizontally when looking from the front. Close both quick release levers. Please pay attention to the instructions about quick release levers on page 12.

Move the chain to the smallest chain ring and the smallest sprocket. Check the chain length. The rear derailleur cage should not be completely swivelled to the back to still apply tension to the chain. Depending on the model, the front boom quick adjust allows an adjustment range of 10 – 15 cm. If you wish to start or end with a different frame length, the hose clip must be loosened and the pulley bracket must be readjusted. Pay attention to the separate assembly instructions of the front boom quick adjust manual.

Adjusting the handlebars

A good setting for the handlebars

While riding you should allow your arms to rest in a relaxed position on the handlebars. Do not push or pull on the handlebars. If the handlebars turn in the stem clamping during the ride stop immediately and tighten the clamping screw of the handlebars. If the handlebars are not sufficiently clamped the handlebars or the stem may be damaged or deformed. In this case, safe clamping can no longer be guaranteed, not even with the correct tightening torque, and handlebars and stem have to be replaced.

Attention! When getting on and off the tricycle, make sure to avoid pulling at the handle bars or stepping on the tie rods. To get off the tricycle, sit upright on the front seat edge and then stand up. Grip the front wheels or the seat back as an extra support, not the handlebars. If you pull firmly at the handlebars, the steering mechanism can be damaged.



The handlebar on tricycle of the Scorpion series allows adjustment in width (1) and angle (2)

Setting the handlebar width and angle on Scorpion models

By changing the angle of the handlebar you can adjust the position of the grip to the length of your upper body and your arms. The handlebar consists of two parts. They are mounted to the stem by a slotted clamp on each side. The adjustment range in width is 3.5 cm on each side, giving a total range of 7 cm (approx. 2 ¾").

Most riders are comfortable with an 85° angle so that the bent grips point upwards and slightly forward. The more upright the grip position and the narrower the handlebar width, the larger the minimum possible turning circle as the handlebars touch your legs or the seat earlier.

Danger! If the handlebar grips are adjusted pointing too far forward or too wide, your hands or the brake levers can touch the front wheels or mudguards when cornering sharp, leading to injury. Make sure you have at least 5 cm (2") clearance between brake levers and front wheels / mudguards at all steering angles.

Attention! If the handlebar grips are adjusted pointing to far forward, the handlebar can touch and damage the track rods when cornering sharp. Make sure the handlebars contact your legs or the seat first before touching the track rods. Damaged track rods must be replaced.

Adjusting the handlebars



Handlebar width and angle are adjusted with the clamp at the stem under the main frame.

Attention! Do not exceed the handlebar width beyond the „max“ mark, otherwise a safe clamping is not possible

In order to change the angle or the width, loosen the screws of the stem/handlebar clamping. Move the handlebars until they are in your favourite position. Tighten the clamping screws with 8 – 10 Nm. Check the correct clamping of the handlebars by sitting down on your tricycle and pulling the handlebars. The handlebars must not turn in the stem. If the clamping screws are tightened too hard, the handlebar may be deformed, and no proper clamping can be achieved.

Tricycles that are equipped with a long handlebar have a screw and a quick release lever at the clamp on the left handlebar side. With this quick release it is possible to loosen the clamping so far that you can swivel the handlebar to the front when folding the frame. The clamping screw and the quick release screw have the above noted tightening torque.

Setting the angle of the handlebar on Gekko-models

The handlebar position on Gekko tricycles will be set with the stem clamping.

Most riders are comfortable with an 85° angle so that the bent grips point upwards and slightly forward. The more upright the grip position, the larger the minimum possible turning circle as the handlebars touches the seat earlier.


The handlebar angle is individually adjustable.

In order to change the angle of the handlebar, loosen the four screws of the stem/handlebar clamping. Move the handlebars until they are in your favourite position. Tighten the clamping screws with 4 – 6 Nm. Check the correct clamping of the handlebars by sitting down on your tricycle and pulling the handlebars. The handlebars must not turn in the stem.

If the clamping screws are tightened too hard, the handlebar may be deformed, and no proper clamping can be achieved. Your bike shop can supply a special fitting lubricant that increases friction between handlebar and stem.

Danger! If the handlebar grips are adjusted pointing too far forward or too wide, your hands or the brake levers can touch the front wheels or mudguards when cornering sharp, leading to injury. Make sure you have at least 5 cm (2") clearance between brake levers and front wheels / mudguards at all steering angles.

Adjusting the handlebars



Handlebar width is adjusted at the stem clamp under the seat.

Danger! Please take care that the clamping area of the stem is thoroughly trimmed and there are no sharp edges which may cause handlebar failure.

Adjusting the cable length

You can make smaller adjustments by moving the cables in their guides at the frame and the stem, so there is enough clearance for all movements. If this is not the case, you will have to have your specialist dealer shorten the cables or replace them by longer ones.

Attention! After having adjusted the handlebar position you have to readjust the length of the brake cables and shifter cables. The cables have to run smoothly without any sharp turns and they should not be bent sharply or stretched when the handlebar is at maximum angle. Also avoid large bows that could be caught up by the front wheels or other parts or touch objects under your tricycle.

Cover all contact areas where cables move and touch the frame with sturdy transparent tape. This protects the paint against scratching and wear or deeper going frame damages.

Handlebar grips

The grips on the handlebar are susceptible to wear and tear. Have your grips replaced by your bike shop once they don't feel comfortable any more. The grips always need to be attached firmly to the handlebar.

Folding

If your recumbent is equipped with a folding hinge, you can fold it and thereby significantly reduce the packing size.

Maintenance work on the folding hinge

To protect the folding hinge against corrosion, observe the notes in the chapter "Cleaning and conservation" on page 92.

Normally, no further maintenance work is necessary. If damage or play should occur on the folding hinge, please contact your specialist dealer.

Folding a Scorpion model with electric drive system

If your trike is equipped with only one battery, you can fold it as described in the instructions.

The folding function will be limited if 2 batteries are mounted. Depending on the model and equipment, it may be helpful to remove the second battery from the trike before folding.

Taking off the seat

First step when folding a tricycle out of the Scorpion family, the seat needs to be removed.

Open all three quick release levers of the seat mountings: Unscrew the nut of the upper seat quick release approximately 4 turns. Turn the quick release levers of the middle and lower seat quick release counter clockwise approximately 4 turns.

With a water bottle mounting installed, space is limited and it may be easier to hold the quick release lever and turn the flat nut on the right side (chain side) of the seat mountings with a 5 mm Allen key approx. 4 turns.

Pull the lower seat half out of its mountings, then the upper seat half.

Attention! When storing the seat, please take care not to bend or break the seat mountings. Protect the edges of the seat mountings with padding to avoid scratching other objects with the seat mountings.

Attention! There is a risk to damage the axis quick release lever that carries the folding buffer. Therefore completely screw the quick release together.

Folding of Scorpion fx 20, Scorpion fs 20

Folding the frame

The folding hinge features a snap-in function. It makes folding easier and prevents the frame from folding even when the quick release is not fastened.

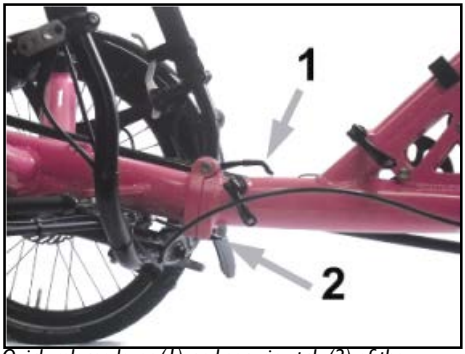
To fold the frame, stand in front of the main frame's cross tube and look to the rear wheel. Grab the quick release lever on top of the folding hinge (1) and pull it upwards. Swivel the lever until it touches the front frame part.

Use your right hand to pull the whole hinge upwards a little bit. At the same time press the securing tab (2) downwards with your thumb. Now lower the frame to open the folding hinge.

Scorpion fs 20 and Scorpion fx 20 only: stem protection rubber parts are mounted on the stem. Lower the frame until they touch the ground.

Grab the rear frame part and swivel it to the front. The strap mounted to the seat tube must be inserted into the fastener mounted

under the left crossbeam. Press the frame parts together until the rubber bumper attached to the seat tube touches the front frame part.



Quick release lever (1) and securing tab (2) of the folding hinge

The chaintubes are connected by a flexible rubber joint positioned in the area of the folding hinge. Make sure all cables and electric wires are long enough to allow proper folding.

Taking off the front wheels

To achieve an even smaller package, you can take off the front wheels (see page 62). In this case you will also have to remove the front mudguards (see page 91).

Unfolding

To unfold and reassemble your tricycle, please follow the steps above in the opposite order. Make sure that after unfolding the quick release lever rests on the front frame part. Else the snap-in mechanism will not work properly.

Lift the folding hinge until the securing tab snaps in. Now close the quick release lever until it touches the rear frame part.

Danger! Before riding your tricycle, make sure the quick release is securely closed. The securing tab must be locked and the quick release lever must be laying on the rear frame part. Cables or wires must run free. The handlebar must turn easily and freely. All seat quick releases must be closed properly.
Please pay attention to the instructions about quick release levers on page 12.
If the folding hinge is not fully closed as described above or if it opens while driving, uncontrollable driving behavior with serious consequences for the accident may occur. Do not start a journey if the folding hinge is defective. Contact your specialist dealer to have the folding hinge repaired.

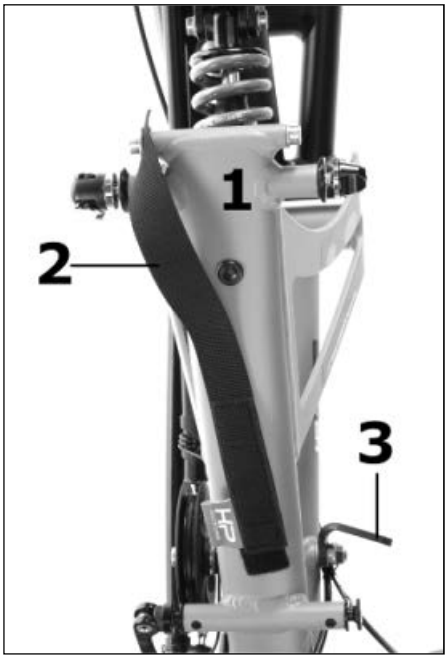
Folding the Scorpion fx 26 /fs 26 / fs 26 Enduro / fs 26 S-Pedelec /plus 20 / plus 26

Folding the frame

The folding hinge features a snap-in function. It makes folding easier and prevents the frame from folding even when the quick release is not fastened correctly.

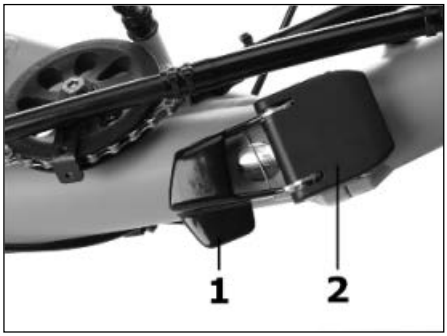
Attention! If the chain does not lie on the smallest sprocket and smallest chainring the chain may be tightened so far that the rear derailleur can be damaged or the derailleur hanger can be torn apart. Before folding shift your gears to the smallest chainring and smallest sprocket.

Fold the left handlebar down so that it does not hit the rear wheel during the folding process (handlebars see page 37).



Once the seat is removed, you can see:
1 - seat tube
2 - Velcro strap
3 - folding stop

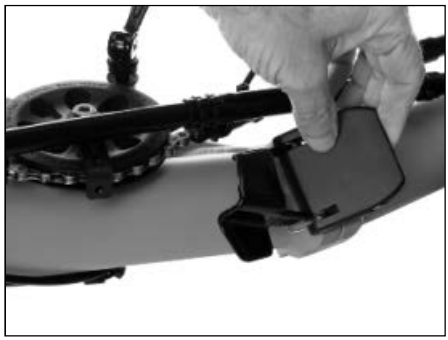
Opening the folding hinge



Closed folding hinge seen from below:
1 – locking lever
2 – folding hinge flap



Opening the locking lever, seen from below



Opening the folding hinge flap, seen from below

To fold the frame, stand on the right side behind the cross tube of the main frame.

Open the locking lever.

Pull the folding hinge flap away from the folding hinge with your fingertips.

With your other hand, press down slightly on the folding hinge from above to open it.

Grasp the main tube behind the boom clamp with your right hand and the seat tube with your left hand. Swing the rear end forward. Do this until the folding stop meets the frame reinforcement sheet.

Folding



When the folding stop hits the frame reinforcement sheet, the frame cannot be folded any further.

Attention. Do not kink, stretch or pinch any cables or wires during the folding process. In the area of the folding hinge, the chain protection tubes are connected by flexible plastic hoses.

When folded, the frame must be secured against unintentional unfolding.

To do this, pull off the securing strap attached to the seat tube by means of Velcro and place it tightly around the cross tube. A corresponding Velcro counterpart is glued onto the cross tube.



A Velcro strap is attached to the seat tube. Place the Velcro strap around the cross tube on the Velcro counterpart attached there. The Velcro strap secures the folded wheel against unintentional unfolding.

Taking off the front wheels

To achieve an even smaller package, you can take off the front wheels (see page 62). In this case you will also have to remove the front mudguards (see page 90)

Unfolding

Loosen the Velcro strap around the cross tube.

Grasp the cross tube with one hand and the seat tube with the other hand. Swivel the rear wheel backwards until the trike is back on all 3 wheels.

Danger! Before driving off, the folding hinge must be completely closed. The folding hinge flap must be engaged and the locking lever closed. No cables or wires must be jammed. The handlebar must be easily and fully rotatable. All seat quick releases must be closed properly.
Please pay attention to the instructions about quick release levers on page 12. If the folding hinge is not fully closed as described above, or if it opens while riding, uncontrollable riding behavior with serious accident consequences may occur. Do not start a ride if the folding hinge is defective. Contact your specialist dealer to have the folding hinge repaired.

Grasp the frame in front of and behind the folding hinge and pull the frame parts upwards so that the folding hinge flap snaps into its counterpart.

Close the locking lever completely (see pictures on page 42).

Folding

Attach the Velcro strap to the Velcro counterpart on the seat tube.

Fold the handlebar back up and close the quick release completely.

Mounting the seat

As first step merge the lower seat connection sheets with their respective connection tube on the frame. Align the seat to the frame centre. Then slide the middle and upper seat connection sheets with their openings on the respective quick release. Be careful to not cause any paint damage. With the BodyLink-seat it is possible to first push in the middle seat connection and then the upper because of its flexibility. In case the seat can not be mounted easily check if the quick releases are loosened enough (if not, unscrew the nuts a little bit more). It may be helpful to punch the seat with your hand to properly fit the seat to the tricycle. Close the quick releases.

Folding the Gekko fx 20 and Gekko fx 26

Folding with D.F.F.-move

Thanks to the Dual-Flat-Fold (D.F.F.) technology, your Gekko fx 20 or Gekko fx 26 folds from a comfortable touring tricycle to a compact package within 10 seconds. Then it can be stored upright or towed on its integrated rollers.

To fold the tricycle, stand on the right side next to the seatback.

1. Open the quick release behind the seat and swivel the seatback to the front.

2. Take the Velcro strap off the second strap and apply it to the soft Velcro under the cross tube to secure the seatback in its position.



3. Open the quick release at the folding hinge. Release the safety bolt against spring pressure. Slightly open the folding hinge. Swivel the quick release lever to the upside so that it is held in an upright position by the sheet metal.







4. Grab the main tube with your right hand in front of the seatback (knuckles facing to the right, away from the frame). Push a little bit to prevent the folding hinge snapping in. Grab the left seat stay with your left hand from the upside (knuckles facing the rear wheel).



5. Now do the D.F.F.-move: Lift the frame, turn it sideways and fold the rear wheel transversely below the frame in a smooth motion. Make sure the folding buffer passes through the long hole in the stem under part to lock the steering. The buffer must not crash on the stem under part as the sheet metal may be deformed.



6. Push the frame together until you can hear the locking sheet metal snaps in. (In case your Gekko is equipped with both the Shimano STEPS electric drive system as well as with a front boom quickadjust, loosen the 2 quick release levers of the boom and turn the boom slightly to the left to allow the locking sheet metal to snap in).





7. Place the folded tricycle upright on the integrated rollers and the buffer inside the folding hinge.

Attention! Don't turn the cranks after folding. To pull the folded tricycle you have to pull it at the frame, not at the cranks or pedals. Else the chain roller or the chain retention hook may be damaged.

Taking off the front wheels

To achieve an even smaller package, you can take off the front wheels (see page 62). In this case you will also have to remove the front mudguards (see page 90)

Folding

Unfolding with D.F.F.-move

To unfold the Gekko fx 20 or Gekko fx 26 stand next to the left front wheel.

1. Grab the left seat stay with your left hand (knuckles facing to the rear wheel). Slide your right hand between main tube and seatback and push the locking sheet metal's tongue away from the seatback. At the same time slightly open the frame with the left hand.



2. Grab the main tube directly in front of the seatback with your right hand (knuckles facing away from the tricycle).

3. Do the reverse D.F.F.-move: Lift the package with drive and pull both frame parts away from each other. Push the folding hinge away from your body. The securing bolt snaps in. Turn the tricycle outward during the move and put it down on the floor.



4. Close the folding hinge quick release.



5. Release the Velcro under the cross tube and put it back on the seat strap.



6. Rearrange the seatback to your desired position and close the quick release.



Folding

Folding on the floor

Alternatively, the Gekko fx 20 or Gekko fx 26 can be folded on the floor:

1. Open the quick release behind the seat and swivel the seatback to the front.

2. Take the Velcro strap off the second strap and apply it to the soft Velcro under the cross tube to secure the seatback in its position.

3. Turn the tricycle on the right front wheel.

Attention! Don't rest the tricycle on the rear rack. It may become deformed.

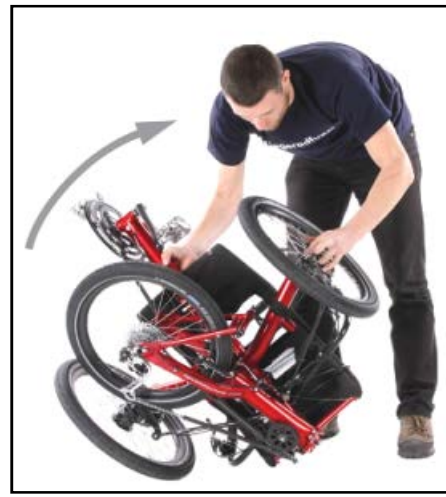
4. Open the quick release at the folding hinge. Release the safety bolt against spring pressure. Slightly open the folding hinge. Swivel the quick release lever to the upside so that it is held in an upright position by the sheet metal.

5. Swivel the rear part forward comfortably. Make sure the folding buffer passes through the long hole in the stem under part to lock the steering.



6. Push the frame together until you can hear the locking sheet metal snaps in.

7. Tilt the folded tricycle sideways to make it stand upright on the integrated rollers and the buffer inside the folding hinge.



Unfolding on the floor

To unfold the Gekko fx 20 or Gekko fx 26, stand next to the rear wheel of the tricycle standing on its rollers.

1. Tilt the tricycle on the right front wheel.

2. Use your right hand to push the locking sheet metal's tongue downwards. Grab the seat stays with your left hand.

3. Swivel the rear part of the tricycle completely to the right. The folding hinge's securing bolt snaps in.

4. Tilt the tricycle back on its wheels

5. Close the folding hinge quick release.

6. Release the Velcro under the cross tube and put it back on the seat strap.

7. Rearrange the seatback to your desired position and close the quick release.

Folding

Danger! Make sure the folding hinge is properly closed. The safety bolt must be snapped in correctly and the quick release fastened tightly.

Danger! An open folding joint can lead to accidents while driving. Make sure that the folding joint is fully closed before starting the journey: the locking bolt must be engaged and the quick release in the rear mount must be firmly closed.
If the folding joint is not fully closed as described above or if it opens during the journey, this can lead to uncontrollable riding behaviour with serious consequences.
If the folding joint is defective, contact your specialist dealer to have the folding joint repaired.

Danger! Always tightly close the quick release at the seat back. The seat is a structural part of the tricycle frame. An opened quick release may lead to frame damage. Please pay attention to the instructions about quick release levers on page 12.



Lighting system

Lighting systems for bicycles

If you want to ride your tricycle on public streets, it must be equipped with a legal lighting system. Do not only use your lights in the dark but also in the twilight of dusk and dawn. Always keep in mind that other road-users may only see you very late or not at all. Make sure to have enough energy reserve if you use batteries.

For the bicycles, HP VELOTECHNIK offers a hub dynamo. The lighting system of a pedelec is powered by the propulsion system's battery.

All lighting systems come with strong LEDs for headlamp and rear light. The LEDs last considerably longer (approx. 100.000 working hours) than a light bulb.

For your safety the light system has a parking light system both at the front and at the rear light, which makes the LEDs shine on approximately 10 minutes after you have stopped riding. The electronic system is maintenance free. Because of the capacitors used you don't have to worry about batteries.

The cables and the contacts can be affected by corrosion or mechanical damage. Therefore, check the lighting system before every ride.



Switch to turn on and out the lighting system



Button on headlight B&M IQ-X to turn on and out the lighting system

Hub dynamo

The lighting system with a hub dynamo is switched on electrically. For this purpose, you will find a button on the back of the headlight. A push of it turns the lighting system ON or OFF. When activated, the headlight is always in SENSO mode. Depending on the brightness of the environment, the headlight operates in "day mode" or "night mode".

The SON hub dynamo is highly efficient and works silently. When the dynamo is turned off it has a very low turning resistance. Although you can feel the single poles of the used permanent magnets very distinctly when turning it by hand the real rolling resistance is minute. (The loss is below 1 W at 15 km/h / 9,5 mph.)

Danger! Do not switch the lights on or off while driving. There is a serious danger of accidents!

Lighting system



SON dynohub

Danger! Do not switch the lights on or off while driving. There is a serious danger of accidents!

Light system with battery power supply

For bicycles that are equipped with an optional electric drive system, they are lighting systems available which are supplied with power via the drive battery. The lighting system is switched on and off via the switching function of the electric drive system. Please also observe the original manual of the drive manufacturer.

Lighting system of Scorpion fs 26 S-Pedelec

The lighting system of the S-Pedelec gets turned on and off with the S-Pedelec system. Under the headlight is a legally required position light mounted. In the rear light is a legally required braking light integrated. This is permanently powered and gets controlled by the switches in the actuating levers of the brake system.

Only ride your S-Pedelec with battery installed. Without battery lighting system and brake light are out of function. The lighting equipment according to S-Pedelec regulation is not sufficient to use the S-Pedelec as a bike according to German StVZO rules even during daytime.

Please pay attention to your countries regulations for public traffic!

Lighting system

Indicator System

The HP VELOTECHNIK indicator system is a device for showing a planned change of direction in road traffic. There is an indicator switch with 2 green LEDs on the handlebar. On both the front and rear side of the trike there is a right and left indicator light.



Switch on the handlebar



Indicator light in front



Rear indicator light

Operation:

Switch on the electric drive system.

Switch on the lighting system if it is not automatically started together with the electric drive.

Press the switch button with the arrow pointing to the right: the indicator lights on the right side flash at the front and at the rear. Both LEDs on the switch flash.

Move the push button of the switch to the middle position to stop the flashing. This does not happen automatically.

The left indicator is activated accordingly by the switch button with the arrow pointing to the left.

The indicator lights on the switch indicate that the system is working correctly, not on which side the lights are flashing. A failure of a LEDs indicates a defect. In this case, contact a specialist dealer.

When driving in road traffic with a defective indicator system, give hand signals to indicate a change of direction.

The indicator lights are attached to slightly flexible arms. If necessary, you can adjust them carefully.

Danger! The cables inside the frame are connected to the electric drive system and are live. Damage to the cable connection may result in a short circuit and consequently in failure of the electric drive system.
If a defect should occur, contact a specialist dealer.

Brakes

Handling of the brakes

Your tricycle is equipped with a powerful high-quality braking system. Please read the separate manual of the brake manufacturer that comes with your tricycle for details.

Make yourself familiar with the braking system. In the standard assembly, both front wheel brakes are operated separately: The left brake lever operates the left front brake, the right brake lever operates the right front brake.

⚠ **Danger!** Make sure to brake evenly using both hands. Braking unevenly or only one side could influence the steering of your tricycle. Maximum braking performance is only achieved when braking with both hands.

If your tricycle is equipped with a rear brake or a parking brake, use this brake only as an emergency brake in the unlikely event of a failure of the front brakes. If the rear wheel is locked up, the tricycle can immediately spin around and slide to the side. Remember which lever pulls the front brake and which the rear brake.

⚠ **Danger!** In case you get into a situation like that during an emergency stop you have to let go of the brakes immediately, balance your tricycle and brake again.

If you are not familiar with the brakes, we recommend you to train at first at low speed and with little braking effect until you find the correct dose for an emergency stop. Practice on a quiet road away from traffic.

Try to avoid braking in bends, though if necessary, touch the brakes carefully! Braking increases the risk of slipping. Especially when it is wet the rear wheel immediately slides out of the bend while braking and this can result in a serious fall!

As an option, your tricycle can be equipped with a coupled braking system with one brake lever operating both front brakes.

For optimum handling some braking systems provide the option to adjust the distance between the brake grip and the handlebar with a small hex-headed screw at the grip, please see the respective manual for details.

The braking effect of modern braking systems can be more powerful than what you have been used to until now. Brake carefully. When you brake too hard with the front brake the rear wheel may lift off the street and the tricycle may tumble over.

If you should hear any unusual sounds while braking the brake pads might be worn out. Do not use your tricycle any further until you have checked the brake pads according to the manual of the brake manufacturer or before having your tricycle checked by your local specialist dealer.

⚠ **Danger!** Please note that the braking distance is much longer when it is wet or when the tricycle is heavily loaded. When riding on wet, sandy, icy or slippery roads you have to use the front brake very carefully to avoid that your front wheels slip. If they do so you will no longer be able to control your tricycle, which might lead to a serious crash.

Danger! Always make sure that the disc or rims and brake pads are free of oil and grease. Be careful when cleaning the bike or lubricating the chain. If the braking parts are dirty, please do not use your tricycle. You can clean oily discs with alcohol or a special spray. Oily brake pads have to be replaced. If you are in doubt, please have your specialist dealer maintain your braking system. Riding with contaminated braking systems can result in serious accidents!

Danger! Never touch neither the brake disc nor the brake calliper after long braking as this may cause serious injury (risk of burns).

Danger! Disc brakes can overheat on long downhill rides, fade and fail! On downhill rides, do not brake constantly, but in several intervals with higher pressure. If you notice that the brake power starts to fade, stop immediately and let your brakes cool down.

New braking systems, new brake pads and new brake discs need a break-in period to achieve maximum brake power. This period lasts for about 30 stops from about 30 km/h (20 mph), without blocking wheels. This should be done in a safe area without traffic.

Parking brake

Always secure your tricycle against rolling away when parked. In the standard assembly, the brake levers are equipped with a parking brake-button that locks the pulled lever. To release the parking brake, pull the brake lever.

As an option the tricycle can be equipped with a parking brake that is operated with a thumb-shifter mounted at the handlebar. It is connected with a V-brake at the rear wheel. Make sure to fully open the parking brake before you start riding.

Maintenance of the brakes

Attention! Always read the brakes manufacturers manuals carefully before doing any maintenance or repair jobs on the brakes! Here you can find detailed information and pictures of how to do it!

The brake pads suffer from wear due to friction and have to be exchanged then. Depending on riding conditions, they can last between a few hundred up to several thousand kilometres. Please read the manual of the brake manufacturer carefully.

Check before every ride:

- that the braking system does not have any damages or leaks by activating the lever, holding it and checking the hose connections for possible leaks.
- that the brake lever pressure is okay by pulling the lever and ensuring that full braking performance is achieved before the lever touches the handlebar. If this is not the case, adjust the cable or change the brake pads, for hydraulic disc brakes pull the lever several times (pump) until it feels firm.
- check the hydraulic braking system for the correct pressure by pulling the lever, holding the pressure and checking the hose connections, bleeding screw and compensating tank for possible leaks.

Cable operated (mechanical) brakes

The brake pads of your brakes are worn when you can pull the lever further and further to the handlebar before the pads touch the rim.

To compensate the wear of the brake pads you can tighten the cable with the adjuster barrel where the cable touches the brake lever. First loosen the locknut, then unscrew the barrel so far that the wheel still turns barely not touching the pads, hold the barrel and tighten the locknut again towards the brake lever housing. Take care that the barrel's slot points downwards to prevent moisture from entering.

Keep the brake cable clean where it is not protected by the cable housing. Due to the mounting position of the brake lever, moisture and dirt may enter the cable and cause drag and excessive wear. Lubricate the ends of the cable to protect against moisture.

Danger! Damaged cables with single wires sticking out have to be replaced immediately. Otherwise your braking system may fail. Please take care that the cable ends are always protected with a cap. Always keep the cables shortly trimmed. Leaving too much cable extending past the cable anchor can result in the cable catching in the rotor or wheel causing the wheel to lock up.

Readjusting mechanical disc brakes

To readjust the brake pads you have to use the big red knobs on each side of the brake calliper. Adjust the inner and the outer pad evenly. In case you are not sure, have this adjustment work done by a qualified bicycle mechanic.

Check your brake pads frequently as explained in the manual supplied by the brake manufacturer. Worn brake pads, oily or damaged pads must be replaced immediately by a qualified bicycle mechanic.

Hydraulic brakes

Hydraulic brakes on HP VELOTECHNIK tricycles use low viscosity mineral oil. Please read the brake manufacturer's manual that comes with the tricycle.

Danger! All maintenance work on the hydraulic system of your brakes may only be carried out by a qualified technician. In case these works are carried out without the required knowledge and skills the braking system might fail which can lead to a serious crash.

Hydraulic disc brakes

Hydraulic disc brakes feature a fully automatic pad wear adjustment. Brake pads and discs are subject to wear, therefore regularly check the thickness of your brake pads and discs and replace them if necessary. The minimum thickness of the brake pad is 1 mm, of the brake disc it is 1,7 mm. For further and more detailed information on your disc brake model please refer to the brake manufacturer's manual.

Danger! The hose at the left knuckle must not be routed under the track rod. This may lead to snapping off the hose. The hose should leave the calliper slope upwards and run in a wide bow to the track rod. The zip ties fixing the hose to the track rod must be tightened properly to prevent it from moving.



WRONG! The bow of the hose is routed under the track rod: Danger of snapping off the hose (cf. arrow).



RIGHT: Lead the wire in a wide bow to the track rod. Check clearance when steering left and right

Danger! If the brake pads or the brake disc are worn out (pads: thickness less than 2,5 mm including metal back, disc: thickness less than 1,7 mm) the pads may be torn out of the calliper while braking. This leads to total loss of brake power.

Attention! Never activate the brake lever with the brake pads not in place or with the wheel dismounted. When you transport the bicycle without wheels always use the transport clips delivered with your tricycle or put a piece of cardboard in the brake calliper to replace the disc. Carefully separate brake pads that have moved together with a screwdriver.

Attention! Keep the brake lever clean. Due to the mounting position, water and dirt can collect inside the lever around the hydraulic cylinder. This may lead to excessive wear or leakage of the hydraulic system.

Gear system and chain

Handling of the gear system

With the gear system you can adjust the pedalling frequency, i.e. the number of revolutions of the crank per minute, to the terrain and the desired speed.

Your pedalling frequency should stay between 80 – 100 revolutions per minute and not fall below 60 while going uphill. If necessary, consult your local dealer and have him adapt the gear range to your style of riding.

Your recumbent tricycle comes standard with a derailleur gear or with an internal hub gear system. The following section refers to the derailleur gear system only. Please also refer to the manual of the gear manufacturer.

You operate the gear changer with the grip shifters or bar end shifters on the handlebars. The right lever for the rear derailleur has an index derailleur system that positions the chain always on the chosen sprocket, so that you don't have to "search" for the gears. The left barend shifter is not indexed so you have to adjust the front derailleur while shifting by slightly moving the shifter to stop the front derailleur from dragging against the chain while pedalling.

Riding a recumbent requires foresighted gear shifting. Before stopping you should timely change in a low gear to make it easy to start off again, without having to pedal heavily.

Attention! Under no circumstances allow the tricycle to roll back while changing the rear gears, or try to pull the tricycle backwards when the gear shifter lever has been moved, as this will damage the rear derailleur.

You should only change the gears while you keep pedalling, smoothly and without applying great force, all the time that the chain is moving between the sprockets. Due to the long cables that expand under pressure and the housing that compresses under pressure it may be helpful for changing gears quickly to turn the bar end shifter a little bit farther than necessary to select a gear and turn it back to the indexed position once the chain has properly shifted ("overshift").

When the chain length has been properly adjusted you can choose every combination of front chain rings and rear sprockets to shift gears. However, it is useful to ride the lowest gears (the biggest rear sprocket) with the smallest chain ring, the middle gears with the middle chain ring and the highest (fastest) gears with the biggest chain ring.

The setup of the chain rings and sprockets leads to an overlap of some gears. This means that different combinations of chain rings and sprockets can result in the same gear ratio. It would be possible to arrange a gear system so that double gears do not occur but this requires a lot of concentration when you shift gears while riding, since you will always have to change the rear sprockets as well as the front chain rings. If you would like to change the setup of your gears, please consult your local dealer.

Danger! Practice shifting gears on a traffic-free street. In the course of this make yourself familiar with the functioning of the bar end shifters. Doing this in traffic could distract your attention from possible dangers.

Gear system and chain

Adjusting the gear system

Your dealer will adjust your derailleur gearing system carefully before handing over the tricycle. But during the first 300 kilometres (186 miles) of riding the cables can stretch, making the gear indexing imprecise. The chain then climbs only hesitantly onto the next sprocket.

Attention! Please read the manual of the gear system manufacturer carefully before working on the gear system.

Adjusting the gear indexing for the rear derailleur

When the chain does not climb up easily after shifting, tense the cable by adjusting the adjuster barrel where the shift cable touches the rear derailleur. Turn the adjusting screw counter clockwise in small steps of half a turn.

Check after each adjustment whether the chain moves smoothly up to the next larger sprocket. To do this, either turn the cranks by hand or ride the tricycle.

When the chain climbs up easily, you need to check that it still goes down easily onto the smallest sprocket. If necessary, turn the adjuster barrel a little more and then try shifting gears again.

Danger! If the chain shifts over the smallest or the biggest sprocket you have to readjust the end-limit adjusters of the rear or the front derailleur. Incorrect adjustment can lead to the chain coming off, getting stuck or damaging the spokes, which may result in serious falls. The adjustment of the end-limit adjusters is a job for a professional bicycle mechanic.

Danger! If the tricycle falls over, the derailleur or its mounting can be bent which results in a change of the derailleur movement range. Check the movement range and have it readjusted by your bicycle mechanic, if necessary.

All moving parts of the gear system are affected by wear. Cleaning and lubricating these parts frequently can prolong the life of these parts. However, they will have to be replaced once worn out.

The cables have to be checked, cleaned and serviced regularly. Expect more wear and corrosion when the tricycle is often parked outside in bad weather conditions.

Attention! Damaged cables that show for example single wires have to be changed immediately. Otherwise, they may damage your gear system. Take care that the ends of the cables are protected with fitting caps.

Chain

The chain is a wearing part that has to be lubricated regularly and to be changed at signs of excessive wear and tear. The amount of wear depends on maintenance and care as well as on the circumstances of your ride (rain, dirt, salt). Regular cleaning and lubricating can increase the chain's lifetime, nevertheless the chain has to be changed when its wear limit is reached.

Lubricating the chain

Diligent lubrication is important. The chain of your recumbent tricycle is approximately 2.5

times longer than a standard bicycle chain (approximately 3.8 m). But it also lasts longer since a chain only wears while bending at the sprockets and the chain rings.

Use good chain oil that won't leave a sticky film on the chain. The chain oil must not contain any aggressive chemical substances that might affect the surface of the chaintubes or chain idler.

We recommend the lubricant PROFIDRYLUBE. This lubricant is purely based on PTFE (Teflon) that keeps the chain clean and dry. This way dirt simply falls off and the tubes always stay clean.

It is important that you clean the chain with a cloth before lubricating. Otherwise the fresh oil washes the dirt that clings to the chain into the gaps and the bushings where the dirt causes heavy wear.

Do not use any solvents to clean the chain! The solvent washes the oil off the bearing parts, stays there and dilutes the fresh oil so that a sufficient lubrication is not guaranteed. If you have treated the chain with a solvent, you will have to heat it up with a hot air gun or boil it in chain grease.

Danger! Take care not to pour any oil on the rims, brake discs or the tires. The braking system could fail or the tires could slip away suddenly. The oil affects the rubber of your tires and can damage it. While lubricating, cover the surrounding area.

An effective protection against corrosion is crucial for a long chain life. Some minutes after you have oiled the chain rub it with a cloth to remove superfluous oil from the outer surface. Wax the chain thoroughly with a wax spray. The wax keeps off water, protects from corrosion and makes dirt fall off easily.

If the chain has become wet after riding in the rain you should put your bicycle in a dry and heated room, and every day you should turn the crank and so move the chain until it is dry again. Otherwise it is difficult for the moisture in the tubes to evaporate which may lead to corrosion at the chain.

Replacing the chain

The chain is one of the parts of the tricycle that will wear out. This shows in a stretching of the chain. Worn out chains do not fit the sprockets and chain rings anymore and wear them away very quickly.

Check the chain for lengthening regularly. For this purpose, try to remove the chain from the chain ring. The chain may come off to a maximum of 5 mm. For a more precise reading you can buy a chain measurement gauge in your bicycle shop.

Only use chains that are suitable for the gear system of your tricycle. Otherwise a precise gear shifting is not guaranteed any more. Please consult your dealer on this topic. He will also assist you in checking your sprockets and chain rings. A new chain does not fit a worn sprocket or chain ring. We recommend rust resistant Rustbuster chains from KMC with smoothly rounded edges. They also provide a good gear changing performance.

Attention! When you change the chain take care that the new chain does not show any sharp edges or burrs.

HP VELOTECHNIK delivers spare chains by the meter via your dealer. For this purpose, please indicate the exact length of your chain or order it a little bit longer if you want to be sure it fits. You will need approximately 4,5 m of chain.

Gear system and chain

The chain length has to be fitted so that the arm of the derailleur is not fully stretched when you shift on the big chain ring in front and the big rear sprocket. The derailleur must still be able to compensate a shortening of the chain by 4 cm. Please also see the manual of the derailleur manufacturer on the choice of the correct chain length.

Attention! The chain has to be closed with a special joining link or a chain riveting tool that expands the ends of the rivet while riveting (ROHLOFF revolver). A poorly joined chain may break, you can come off the pedals and fall. If you are in doubt, please have adjustments of the chain length or the changing of the chain be done by your bicycle mechanic.

Take care that the joining link is not bigger in size than the other chain links to avoid irregular chain sounds. We recommend the joining links by KMC. Every time you change the chain you also have to apply a new joining link. There are different types of joining links available fitting different types of chains.

Make sure that any chain links in the chain are not stiff, as this can cause some annoying and not obvious problems with the gear system.

Make sure that you have not twisted the chain 180 degrees before joining it back together.

Chain protection tubes

The chain protection tubes are made of a long lasting plastic that features very low friction, slow wear and good noise damping. The tubes protect your clothes against the chain oil as well as the chain against dirt from the road. The upper tubes are fastened with an interchangeable retention spring, the lower tube runs through an adjustable clip.

The tubes are worn by the chain and have to be cut at the ends and expanded again (or exchanged) after 3.000 – 5.000 km approximately, depending on the chain type and the overall riding condition. You can extend this maintenance interval by turning the tubes by a quarter turn from time to time so that they do not keep wearing out in the same place.

The intensity of the wear depends mainly on the chain type. In order to perform any work at the chaintubes you'll have to open the chain and finally close it again. Please see also the instructions on "Chain" on page 57.

Danger! Take care that the chaintubes keep at least a 5 cm distance to the rear and front derailleur when the chain is stretched to the maximum, and that the tubes are well fastened. If necessary, you will have to shorten the tubes. If the end of a chaintube gets into the rotating parts of the drive train the drive train can be blocked and the chaintubes may be destroyed.

Danger! The rear ends of the upper chaintube have to be secured against moving with a tight rubber tube over the retention spring. Without the rubber tube the chaintube may be dragged forward into the turning chain roller or chainring and thus be damaged by the chain.

Danger! Check the chaintubes frequently if they are damaged or defective. Replace defective chaintubes immediately. If the chaintubes are worn in the area of the retention spring or tube mountings, the chain will touch the retention spring, leading to failure of the spring and mountings. As a result, the chaintube can get into the drive train and block it!

Expanding the tube ends

The ends of the tubes are expanded like a trumpet so that the chain can enter smoothly without friction and without making noises.

When the ends are worn out you can renew them by expanding them again. Remove the chain by opening the joining link or open it with a special chain riveting tool. Cut the worn part of the tube exactly perpendicular with a sharp knife.

Heat the last 5 – 10 mm at the end of the tube with a gas burner, a hot air gun, or a candle and turn it permanently until the colour of the utmost edge turns from a dull black to a shiny black. Take care that the tubes don't catch fire. At any rate work in a place with sufficient ventilation.

Expand the end with a proper tool, e.g. the rounded grip of a screwdriver. Quench the expanded end immediately with cold water.

If the tube is too short after you have cut it so that there is not enough protection anymore it has to be replaced. You can buy spare tubes either as uncut tubes or already cut into the correct length, complete with retention spring from your specialist dealer.

Replacing the tubes

In order to exchange single parts in the upper chaintubes cut the old tube at the retention spring at the chain roller and pull the remaining part off the spring. Now move the smooth part of the new tube through the spring and rubber tube, then expand the tube end as described above.

Changing the complete upper chain protection or the retention spring

Remove the bolt in the chain roller with an Allen key 6 mm. Take off the chain roller, the washer and the chain retention hook.

The end of the threaded tube in the frame is protected with a plastic tube. Take the retention spring off this plastic tube and put on the new retention spring. Turn the spring so that the retention springs run under the spacer to the tubes and the wires lie between frame and chaintube; that way the spirals face outwards.

Push the bolt back through the chain roller, the washer and the chain retention hook, secure the thread with LOCTITE and tighten the bolt with 17 – 19 Nm. The recessed side of the chain roller has to face to the frame. Make sure the washer is placed between chain roller and plastic tube / frame.

The distance of the upper chaintube to the chainwheel can be adjusted by sliding the tube in the retention spring. It must be secured with the rubber tube over the spring.

To adapt the chain protection tube to different lengths when using the optional front boom quick adjust, we offer a length adjustable upper chain protection tube.

Changing the lower chaintube

The chaintube is connected to the mounting plate by a rubber sleeve. For dismounting the chaintube, grab the sleeve on its rear end and pull it together with the chaintube to the rear. The rubber sleeves will release the rear tongue of the mounting plate then. Swivel the chaintube sidewards. Having done that pull the chaintube to the front to release the

sleeve from the front tongue of the mounting plate. Replace the chaintube and mount it by following the above steps vice versa.

Chain roller

The chain roller guides the chain below the seat to the rear wheel and is an essential part of the HP VELOTECHNIK "No Squat" design. It ensures that the suspension is not influenced by pedalling.

Compared to other models the chain roller has a big diameter and it has a higher area in the middle to make the chain move as smoothly as possible. Due to this higher area the chain does not lie on the roller with its sharp edged links but with the bushes in the middle that work like small bushings. In addition to a very low rolling resistance it also supports a quiet chain movement. A chain retention hook between the frame and the chain roller locks the roller at the bottom and keeps the chain on the roller when you pedal backwards.

Attention! If this chain retention hook is missing the chain may fall down. When you start pedalling then the chain roller, the seat or the frame may be damaged through the chain. Please consult your local specialist dealer in case this hook is missing.

The chain roller wears slowly and gradually shows a sprocket shape in the higher area in the middle. When this middle area is worn completely the links of the chain will run on the roller. In that case you will notice that the chain makes more noise while running and you should change the roller. You can purchase the plastic part without the bearing or the complete roller through your dealer.

Attention! The roller comes with two maintenance free sealed bearings. The bearings are exchangeable. Between the bearings there is a spacer that keeps the correct distance. If you forget to put in the spacer after you have dismounted the bearings, they will be destroyed when you tighten the screw while remounting them.

The bearings must not be treated with a jet of water from a high-pressure cleaner or with solvents since this may destroy the sealings and remove grease from the bearings. If the bearings don't move smoothly anymore you'll have to replace them.



Chain roller, chain hook and chaintubes on Scorpion fs 26

Dismounting and mounting of the chain roller

To dismount the chain roller, the chaintubes need to be removed. See also hints on replacing the chaintubes (page 60)

The chain roller is not symmetrically shaped; the recessed side of the chain roller has to face to the frame, the flat (logo) side outwards.

Wheels

Disassembling the wheels

Front wheels

To remove a front wheel, loosen the bolt in the locking part at the inside of the knuckle at least 6 mm. Pull the locking part away from the knuckle. Pull the wheel a few mm away from the knuckle and slide the axle through the slot in the knuckle. Take care not to bend the brake disc.



Loosen the screw in the locking part



Taking out the front wheel out of the knuckle

When reinstalling the wheel slide the disc carefully between the brake pads and take care not to damage them. Tighten the screw in the locking part with 8 – 10 Nm.

Front wheels (Gekko 26)

To remove a front wheel, pull off the plastic cap on the inside of the wheel. Use a 17mm wrench to loosen the M12 nut on the inside (hold the screw head on the outside of the wheel with a 6mm hex key if neccessary).



Front wheel assembly of Gekko 26

Remove the nut and the washer and pull out the screw completely. Slide the wheel out of the brake caliper. Take care the spacer bushings in the knuckle won't be lost.



Front wheel mounting parts of Gekko 26

To reassemble the wheel slide the disc carefully between the brake pads and reinstall the screw, the washer, and the nut. Tightening torque of the nut is 8 – 10 Nm. Put the plastic cap back on.

Rear wheel

According to the configuration the rear wheel is mounted with a quick release or with nuts. Open the quick release or loosen the nut with a 15 mm wrench to disassemble the rear wheel.

When closing: make sure to properly close the quick release lever or tighten the nut with the torque given in the original manufacturer manual. You will find the part number on the hub.

⚠ **Danger!** Rear wheels can be fastened with a quick release mounting and therefore they are susceptible to theft. For this reason, always lock the wheels along with the frame to a solid object when you park your bicycle somewhere.

Tires

The correct air pressure is decisive for smooth running and a good protection against punctures. The maximum pressure is printed on the sidewall of your tire. You might find an indication of the minimum required pressure on the sidewall of the tire as well.

Since the tubes in the tires gradually loose air you should check the air pressure before every ride.

The tubes come with Presta valves (also called french valves). They are very airtight and easy to pump up.

To do so, first screw off the valve cap. Now you see a small threaded rod with a knurled nut that comes out of the valve. Loosen the knurled nut as far as it is possible.

To pump up the tire and check the pressure you need a pump with a gauge, preferably a solid floor pump. Put the knob of the pump on the valve, push it completely on the valve

and then retract it a little bit. Now you can pump up your tire easily.

After you have pumped up the tire to the desired pressure pull off the pump knob. Secure the valve by turning the knurled nut on the threaded rod properly against the valve body. Finally put on the valve cap again.

Danger! Never pump up your tires beyond the maximum pressure. The tire may burst while riding or come off the rim, which may result in a serious fall and injury.

Danger! Check your tires for damage on a regular basis. You should exchange tires with worn threads or damaged sidewalls. Damaged rim tapes have to be exchanged immediately. Damages at the tires may lead to a sudden burst of the tire and thus result in a serious fall and injury.

After you have exchanged the tires please check if the wheels turn freely and check the minimum distance between mudguards and frame.

Front wheels of all Scorpion and Gekko models

When you exchange tires please note the maximum width limit of 50 mm (approximately 2"). On the front wheels you have to use tires of ETRTO size 406 (20").

Rear wheel of Scorpion fx 20 /fs 20 /plus 20 / Gekko fx 20

On the rear wheel you have to use a tire of ETRTO size 406 (20"). The tire width possible at your bicycle depends on the size of your rims. Please ask your local dealer.

Rear wheel of Scorpion /fx 26 /fs 26 / plus 26 / Gekko 26 / fx 26

On the rear wheel you have to use a tire of ETRTO size 559 (26"). The tire width possible at your bicycle depends on the size of your rims. Please ask your local dealer.

Wheels of Scorpion fs 26 S-Pedelec

You are only allowed to exchange tires mounted as standard with tires including design approval of the following size:

Front wheels

- ETRTO 40-406
- ETRTO 47-406

Rear wheel

- ETRTO 40-559
- ETRTO 47-559

The tires need to feature a speed index that covers the maximum speed of 45 km/h (at least B). Additionally, they need to feature a load index according to the maximum permitted axle load (rear 26, front: 28). These indexes are shown on the tire's sidewall.

For tires 47-406 and 47-559 "SCHWALBE Energizer" (series tires) the recommended pressure is 5 bar. When using other tires please pay attention to their maximum allowed pressure.

Spokes

The spokes of the wheels connect the rim to the hub. They transmit the braking power of

the disc brakes, and in addition they transmit the pedal forces at the rear wheel.

The tricycle requires a high spoke tension (> 1000 N) as the wheels have to bear high side loads. Any damaged spokes must be replaced immediately.

Attention! To true up the wheels you need special skills, please have this work done by an experienced bicycle mechanic.

Danger! Take care that your spokes are always in perfect condition and the spoke tension is balanced. Do not ride with wheels that run untrue or wheels with loose or missing spokes. These faults may lead to a total failure of the wheel while braking and result in a serious fall!

Headset

Adjusting the headset on Scorpion, Scorpion fx20 /fx26 and Gekko models

The knuckles that connect the front wheels to the frame are supported by A-Head-type headsets. (The following information are only valid for tricycles without front suspensions. For those, please refer to page 80).

The headsets must be adjusted in order to let the knuckles with the front wheels attached turn easily without showing play.

To check the bearing play, pull the front brake and grab the upper bearing cup with your other hand. Now move your tricycle back and forth. If the bearing has play the upper cup moves noticeably in contrast to the fixed part. In this case loosen the clamping screw of the clamp above the upper bearing and tighten the screw in the cap a bit more. Afterwards, fasten the clamp again.



View into headset with star fangled nut inside

To check whether the front wheel turns smoothly lift your bicycle at the frame so that the front wheel moves freely above the ground. When you hold the frame straight and push the handlebars slightly they should move smoothly from their middle position. If the bearing is too tight, loosen the clamping screw of the top clamp and loosen the hex-headed screw in the end cap a little bit by turning it counter clockwise. Fasten the clamp again afterwards.

On tricycles the headset is tightened a little bit more than on bicycles. A headset that is tightened too much leads to excessive wear and damage of the bearing.

Attention! The hex-headed screw in the cap only adjusts the play of the headset bearing. This screw will not safely hold the knuckle in the frame. Take care that the clamp is tightened as prescribed after you have finished your adjustment. Please pay attention to the table of fastening torques on page 95.



The holding sheet of the mudguard is fixed with the cap to the headset

If your tricycle is not equipped with mudguards, there will be a spacer (5 mm) between cap and clamp. When mudguards are installed, the spacer is replaced by the mudguard mounting. After the adjustment of the headset bearing, align the mudguards in a way that they won't touch the front wheel.

Wheel alignment

Measuring toe-setting on Scorpion / Scorpion fx20 /fx26 and Gekko models

Both front wheels should be parallel to each other, viewed from above the tricycle, compare picture below.

The condition of the front ends of the front wheels being closer together than the rear ends of the front wheels (b_v smaller than b_h) is called toe-in, the condition of the front ends of the front wheels being further apart than the rear ends of the front wheels (b_v larger than b_h) is called toe-out. The measures are taken at wheel axle height on the rim sidewalls.

If the front wheel alignment is incorrect, you will suffer excessive tire wear and increased tire drag. Check your front wheel alignment regularly. The proper tolerance on toe-in is 0 – 2 mm (1/16"). For correct measuring properly trued wheels are required.

To check the toe setting, turn the handlebars into the neutral position, so that the wheels are aligned straight forward. Measure the distance between the front inner or outer edges of the front wheel rims (b_v) and the rear inner or outer edges of the front wheel rims (b_h) 25 cm (10") above the ground.

The distance between the front edges b_v must be 0 – 2 mm (1/16") smaller than the distance between the rear edges b_h.

It is important to measure the distances at the same height of 25 cm (10") above the ground, as the front wheel are not exactly perpendicular to the ground, viewed from the front of the tricycle. Measuring at varying heights results in measuring errors.

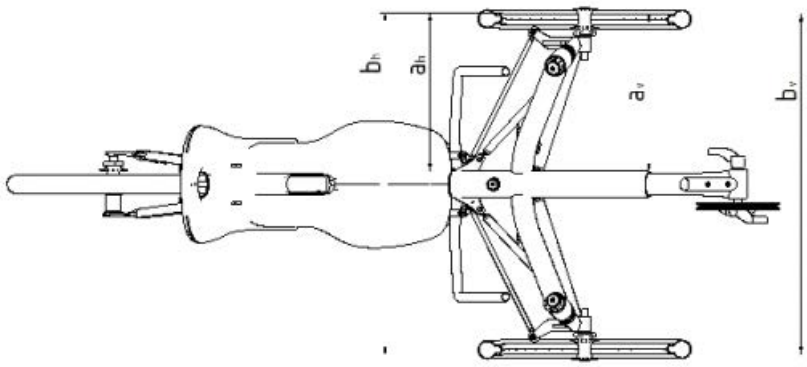
Measuring toe setting on Scorpion fs 20/ Scorpion fs 26/ fs 26 Enduro / fs 26 S-Pedelec / plus 20 / plus 26

The distance between the front edges on full suspension tricycles b_v must be 0 – 2 mm (1/16") smaller than the distance between the rear edges b_h. If toe-in is checked in unloaded condition, the proper tolerance is 2 – 4 mm (1/16" – 1/8"). Then, the correct value is reached under normal riding conditions with the front wheels deflected by ca. 20 mm. The adjusting procedure in other respects is the same as for models without front suspension (e.g. Scorpion and Gekko).

Adjusting toe setting

The front wheels are held by suspension struts which can turn at the ends of the main frame. The suspension struts are connected by tie rods to the handlebar stem.

The rod ends consist of ball-and-socket bearings that can be screwed in or out of the tie rod for length adjustment.



Wheel alignment



Inner rod end



Outer rod end

Length adjustment is done at the inner tie-rod end, at the connection to the handlebar stem. The outer rod end is screwed completely into the rod and secured with thread locker. Do not try to turn this side of the rod end.

First make sure that the handlebar is aligned perpendicular to the main frame tube. Identify which wheel (or perhaps both wheels) needs adjustments of the toe-in by measuring the distance between rim wall and main tube on the most forward point and on the most backward point of the rim (value a_v and a_h in the picture). The distances should be roughly identical for one wheel.



Remove the bolt that connects the inner rod-end to the handlebar stem, note the washer.



Hold the rod-end with a wrench and loosen the nut that is screwed against the rod-end.

Attention! Do not move the rod-end beyond its limits, or it will be destroyed or get excessive play. Always hold the rod end with a wrench or secure the tie rod with a wrench against turning when tightening the locknut.

Wheel alignment



Screw the rod-end into the tie-rod to enlarge the distance b_v between the front edges of the front wheel. Screw the rod-end out of the tie-rod to decrease the distance of the front wheel edges.

Danger! The rod-end must be screwed at least 8 mm into the tie-rod. If it is screwed out to far, the thread could tear out and the tricycle could become unsteerable. This means that with a standard length of the thread of the rod-end of 24 mm, a maximum of 11 mm visible free thread length is allowed between rod-end and locknut.

Danger! The locknut must be screwed tight to the tie-rod, otherwise the rod-end could loosen up or play could develop. Please pay attention to the table of fastening torques on page 95.

Attach the tie-rod to the handlebar stem: First, the screw is put through the hole in the stem (from upside to downside).
Then slide the washer and the rod end onto the screw. Finally, put on the self-locking nut. Measure the toe-in as described above. Repeat the adjustment process until you reach the required toe-in setting.



Align both rod-ends parallel to each other. Grip the rod-end with a wrench and tighten the nut against the tie-rod with 4 – 5 Nm.



Attention! Make sure the washer is between rod end and bracket to allow the full movability of the rod end.

On the other side of the rod the rod end is mounted on the underside of the suspension strut's steering lever. Between strut and rod end there is a washer and a spacer. There is an additional spacer between screw head and rod end.

Danger! Secure the thread of the bolt with LOCTITE adhesive. Check all connections of the steering system before every ride. If a connection loosens, the tricycle becomes unsteerable which may lead to serious injury.

Wheel alignment

Setting of camber angle on Scorpion fs 20 / fs 26 / fs 26 Enduro / fs 26 S-Pedelec / plus 20 / plus 26 (information for bicycle mechanics)

The McPherson axle on the full suspension tricycles is equipped with adjustable wishbones. By adjusting the rod ends on the wishbones, the required axle specifications can be met. During assembly in our factory, the front axle was adjusted correctly. In case of replacement of worn-out or damaged parts the front axle needs to be readjusted. In unloaded condition, the following adjustment values must be met:
- toe setting: 2 – 4 mm toe-in
- camber angle: +0,5° (+0,5°/-1,5°)
- max. difference in camber angle le./ri.: 0,5°
- caster angle: 76,7° (+/-1°)

Attention! Always check the front axle specifications after accidents or unintended events such as riding through a deep road hole or contact with the curb at higher speed as well as after replacing axle components. An incorrect adjustment can lead to increased tire wear and uncontrollable handling.

For measuring, the tricycle must stand on a plane, non-inclined floor.

To measure the caster angle, the front wheels must point straightforward. Attach a protractor to the front side of the fender bracket.



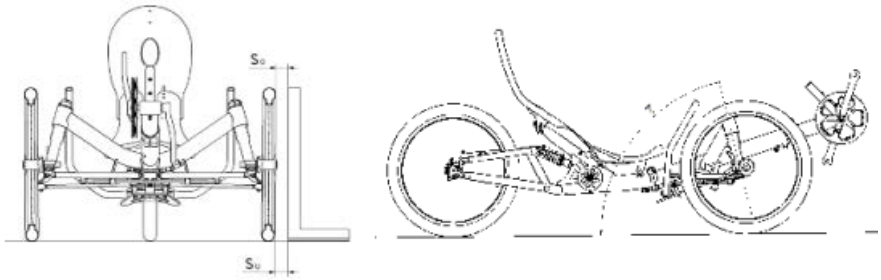
Place the protractor on the fender bracket to measure the caster angle.



Align the protractor parallel to the brake disc.

Make sure that the protractor only rests against the fender bracket and not against the head tube of the frame. The protractor must be parallel to the plane of the brake disc.

To measure the front wheel's camber angle position a long square next to the wheel concentric with the wheel axis. Set the lower distance between rim wall and square to 40 mm (s_u = 40 mm). The upper measure s_o between rim wall and square should be 36 mm (+0,5°positive camber) now and must be in a



Setting of camber- and caster angle on full suspension tricycles

range of 32 mm (+1° positive camber) to 48 mm (-1° negative camber). The difference between the measure s_o on the left and right wheel must not exceed 4 mm.

For adjusting works, the tricycle should be mounted in a work stand, best upside down. The stabilizer bar must be disassembled.

To adjust the front axle both rod ends of one wishbone must be disassembled from the frame. Loosen the counter nuts and screw in or out the rod ends according to the table. Values in between can be interpolated.

Check the values after provisionally reattaching the wishbone and wheel on a plane floor. Repeat the adjustment if necessary.

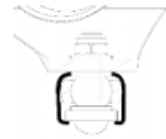
After having reached the correct setup, fasten the counter nuts of the rod ends with 4 – 5 Nm.

screw out: + screw in: -	rotations of forward rod end	rotations of backward rod end	rotation of tie rod end
caster angle			
lower by 1°	+1	+2	+2
rise by 1°	-1	-2	-2
camber angle			
decrease s_o by 8 mm	-2,5	-2,5	-4
increase s_o by 8 mm	+2,5	+2,5	+4

Danger! If the thread of the rod end is not screwed deep enough into the wishbone, the rod end may tear out and the tricycle may become non-steerable. Screw the thread of the rod end into the wishbone at least as deep as specified: front rod end: at least 10 mm, rear rod end: at least 8 mm.

Reattach the foam tube that covers the large rod ends and a short part of the oval wishbone tube. Mount the rod ends to the frame brackets.

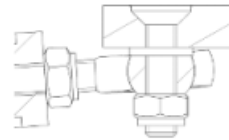
self locking nuts for M8 bolts
washers for M8 bolts
frame
washer for M8 /foam tube*
rod end
washer for M8 /foam tube*
connection sheet metal
countersunk bolt M8x30
black: cover hose



Front wishbone mount parts order, tightening torque 13 – 15 Nm

Attention! The connection sheet metal must not get in contact with the tricycle frame. Depending on the date of delivery there are different versions of the rod end. For earlier used smaller rod ends there need to be two washers M8 (marked by * in the picture above) between rod end and frame as well as between rod end and connection sheet metal.

countersunk bolt M6x25
frame Scorpion fs 26
washer for M6 bolts
rod end
self locking nut for M6 bolts



Rear wishbone mount parts order, tightening torque 7 – 9 Nm

To finish the front axle setup measure and adjust the toe as described in "Front wheel alignment" on page 71.

Adjusting the suspension

Suspension and damping of all Scorpion models

Rear suspension and full suspension tricycles allow compensation of bumps and roughness of the track for advanced comfort and reduce forces on the tricycle.

A well-adjusted suspension improves the traction of your tricycle on uneven roads. Especially when riding in a bend this allows a higher speed and also improves safety.

In order to achieve maximum riding comfort, the suspension settings have to match your weight as well as the road condition.

The goals of the adjustment are:

- maximum use of the available suspension travel without the suspension frequently bottoming out
- quick reaction of the suspension without obvious oscillation after having passed a bump
- avoiding self-enforcing oscillations, that means increasing oscillations of the suspension system due to pedalling influence, rhythmic body movements or permanent wavy underground

The improvement of road holding the suspension gives you a plus of safety.

The suspension system of the rear swingarm consists of a spring and a damper.

Often, the terms suspension and damping are used inaccurate in everyday language.

The spring is the elastic element that compresses and expands due to the load changes, which e.g. occur on bumpy roads. While expanding, the spring releases the same energy it took to compress it.

The rear swingarm is suspended with a steel coil spring in the standard version. The optional rear shock ROCKSHOX Monarch uses air as spring medium.

The damper slows down the process of compression and expansion. That means the tricycle does not immediately "spring" back to the initial position or even further than that after having passed a bump. The damper converts spring energy into friction and finally into heat, and thus takes away energy from the suspension system. The damper prevents the spring from swinging uncontrolled after an initial stimulation. In addition, the damper helps to avoid self-enforcing oscillations of the suspension caused by recurrent stimulation like pedalling forces within a crank revolution or the rhythmic up and down movement of the legs.

In case you have mounted the optional suspension element ROCKSHOX Monarch, the hydraulic damping of the rear suspension is adjustable. The more you increase the rebound setting, the slower the system comes back to the normal position after a compression.

Adjusting the suspension

You should always set the damping as low as possible to give the tricycle the possibility to quickly react even to several bumps in a row.

You can ride a recumbent tricycle with a considerably lower damping rate than for example a MTB: due to the relaxed and steady position of the body the recumbent does not experience extreme variations in the load as it is known from dancing on the pedals while riding uphill on a mountain bike.

In addition to this, varying pedalling forces have very little influence on the suspension of the tricycle due to the No Squat design of the suspension system of the tricycle. So when you adjust the damping, always start with a low damping rate.

It is necessary to choose the correct spring stiffness to have a well operating suspension system. The spring stiffness is a measure for the compression of a spring at a certain load.

Adjusting the suspension

It is either given in "N/mm" (Newton per Millimetres) or "lbs/inch" (Pounds per Inch). Sometimes you only find "lbs." printed on the springs. The spring stiffness of the optional air shock ROCKSHOX Monarch is set by adjusting the air pressure.

The suspension is designed in a way that the spring is compressed partly when you sit down on your tricycle. This is called negative suspension travel (or "sag") and it enables the spring to expand on bumpy roads. (This is in fact a definitely positive feature.) You should choose a spring stiffness with which this negative suspension travel takes up around 30% of the overall suspension travel. This value usually provides a very comfortable ride on your suspended recumbent tricycle.

Danger! While adjusting the rear suspension element never load the tricycle e.g. by resting on the seat or loading the rear rack when your hands or tools are close to the suspension element. Your hands may get caught and squeezed when the suspension compresses.

Adjusting to load

The luggage carrier of your recumbent tricycle is mounted to the suspended part of the frame. That way your luggage is also fully suspended and it spares the material. Most notably, even under heavy load the suspension will compensate an uneven road much better and quicker compared to a design where the luggage carrier is mounted to the unsuspended parts, e.g. the rear swingarm.

Additional luggage changes the load on the wheels and their suspension. The springs are further compressed initially through the load and there is less suspension travel for bumps while riding. Your suspension will bottom out more often.

The suspension of the front wheel is less affected since luggage at the rear rack almost only puts weight on the rear wheel. Only in case of heavy luggage on the lowrider under the seat there is an influence on the front wheel.

In order to compensate the variations in the load you can change the pre-load. For details see the following chapter.

Theoretically adjusting the preload can compensate for a load change of approx. 10 kg (23 lbs) at the rear wheel. In case of higher variations in the load you will have to exchange the spring with a spring with different spring rate. In practice, you can often do without it: With a suspension travel of 80 mm on the rear (and 60 mm on the front of full suspension tricycles there is a lot of suspension travel for a touring tricycle. When you choose the spring rate to have the full 80 mm at your disposal when your recumbent is under maximum load, you will have a somewhat smaller but still very comfortable suspension travel when you ride without luggage.

The optional air shock ROCKSHOX Monarch can be easily pumped up to compensate load increases.

Rear suspension element

Adjusting the rear suspension element of all Scorpion models

⚠ **Danger!** While adjusting the rear suspension element never load the tricycle e.g. by resting on the seat or loading the rear rack when your hands or tools are close to the suspension element. Your hands may get caught and squeezed when the suspension compresses.

For the rear suspension, a spring element is combined with a hydraulic damping unit in a suspension element. The damping results from fluid friction of oil flowing through thin holes of a valve in between two chambers inside the damper. A slightly noticeable sound that may occur from this oil flow is normal. Due to the fluid friction, the spring element may heat up, therefore touch the spring element after a ride only very carefully.

⚠ **Danger!** The suspension elements are filled with gas under high pressure. Never try to open the damper or to remove the screw at the gas tank. Inside the damper there are no user serviceable parts. In case of damage you will have to take the complete suspension element to your dealer.

The tricycle comes standard with a steel spring rear shock. As an option you can get the air shock ROCKSHOX Monarch that uses air as spring medium.

For a maximum of riding comfort, the system should use about 30% of its travel while you sit on the tricycle in driving position. ("sag").

Steel spring rear shock DV-22

Adjustment

The preload determines how far the suspension compresses when you are sitting on the tricycle while standing still. Therefore, it is necessary that you have the correct spring stiffness according to your weight. On page 75 you will find more information about changing the springs.

Measure the distance between the two suspension element bolts or between rear rack and rear wheel while the tricycle is unloaded as well as while sitting on the tricycle in riding position. Also take into account possible luggage. Find out the total suspension travel possible for your tricycle with the method described above, depending on the mounted add-on-parts and clips on the piston rod. The static compression should amount to about one third of the overall suspension travel.

You can affect this negative suspension travel depending on how much you weigh and how much you load your tricycle either by adjusting the suspension pre-load for fine tuning or by replacing the spring with a spring with a different stiffness in the rough tuning.

In order to adjust the suspension pre-load, turn the adjustment ring on the threaded part of the suspension element by hand. Turning the adjustment ring clockwise (looking at it from behind) reduces the preload, turning it counter clockwise you screw the adjustment ring towards the spring and increase the suspension pre-load. It is helpful to turn the spring together with the adjustment ring.

Rear suspension element

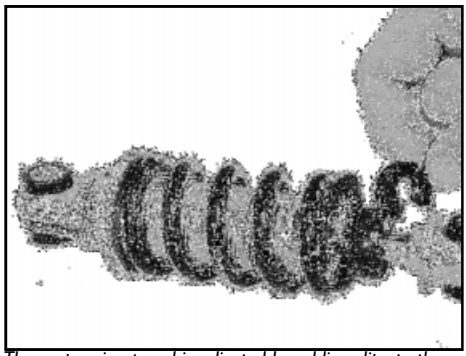


Steel spring suspension element with fixed damping rate.

Danger! The adjustment ring has always to be screwed on so far that the spring has no play when unloaded. Otherwise the adjustment ring could come loose through shocks while riding and the slotted rear spring retention disc comes off. In that case the suspension element may be damaged or the rear wheel can hit the frame or rear rack, which may lead to serious falls. Always have an initial preload of at least half a turn on the spring.

The adjustment ring should be turned not more than five turns (measured from the relaxed position) towards the spring. If the suspension compresses still too far even after six turns, the spring is too soft and has to be replaced by a harder spring. A too high preload with a too soft spring will not take advantage of the full comfort potential.

Danger! Take care that the rear wheel or mudguard or suspension element never hit the frame, seat, rear rack or luggage box while the suspension is fully compressed.
Therefore, relax the spring completely by turning the spring retention disc on the thread of the spring element as far as possible (before this, push the possibly existing safety spring ring from its slot in the threaded section as far as possible). Have a second person sit down on the tricycle and make the suspension bottom out by leaning on the seat or the rear rack.
If the distance between the wheel or mudguard and the frame, seat, or rear rack is smaller than 1 cm you will have to mount an additional spacer. In case you don't, the mudguard may break suddenly or the rear wheel might be blocked which can lead to serious crashes.



The suspension travel is adjusted by adding clips to the piston rod of the spring element.

Changing the steel spring (DV-22)

You can buy the spring for the rear suspension element in different spring rates at your dealer.

We recommend the following spring rates, depending on the overall weight:

Rear suspension element

Load	Spring stiffness
• *up to 80 kg:*	*450 lbs/inch*
• *up to 110 kg:*	*550 lbs/inch*
• *up to 140 kg:*	*650 lbs/inch*

In addition to this, your dealer can also use springs with other spring rates or special lightweight springs made of titanium.

In most cases the rate is printed onto the spring. Pay attention to the correct imprint since the term "B650" that sometimes occurs does not necessarily mean 650 lbs/inch!

Spring length: DV-22: 70 – 90 mm

In order to change the spring, you will have to remove the rear screw and swivel away the rear frame.

Hold the main frame of your bicycle in a work stand.

If there is a safety ring at the thread of the suspension element move it to the end so you can unscrew the adjustment ring completely and then turn it to the outer position at the end. Remove the slotted spring retention disc at the other end.

Loosen the screws of the rear suspension element with two Allen keys and push the screw out of the suspension element's eye.

Danger! If the bicycle does not stand on the ground while undoing the screws of the suspension element, the rear swingarm may come down uncontrolled afterwards and hurt you seriously. In addition to this the cables of the gear system and the brakes may overstretch and you will have to replace them. Ensure that the rear swingarm comes down in a controlled and gentle way by putting up a solid string or zip tie between the main frame and the rear swingarm.

Danger! When the bicycle is standing on the ground the frame and the swingarm come up against each other. Please make sure that this happens in a controlled and gentle fashion. Put a cloth between the contact surfaces. Otherwise, if they come up against each other uncontrolled your hands may get caught between main frame, rear swingarm and suspension element and your bicycle may be damaged.

Move the rear swingarm down carefully. While doing this, take care that you don't bend or stretch any cables.

Remove the spring from the suspension element and put on the replacement spring. Make sure the new spring has the same diameter and length as the old spring and that it is supported safely by the adjustment ring.

Put back the slotted spring retention disc on the piston rod. If necessary, compress the spring a little bit. The spring retention disc has to match its support at the end of the suspension element.

Secure the spring by tightening the adjustment ring until the spring doesn't show any more play. If there is a safety spring ring, push it back into the slot on the thread.

Move the rear swingarm back up and connect the rear end of the suspension element with the rear swingarm using the bolt. Lubricate the bolt thoroughly.

Secure the screws of the suspension element with thread locker (e.g. LOCTITE 243) and tighten the screws with 6 – 8 Nm.

After having exchanged the spring you have to readjust the spring preload as described in the chapter on "Adjusting the suspension" on page 72.

Rear suspension element

Cleaning and lubricating

Do clean the suspension element, especially the polished piston rod, if it is dirty. Remaining dirt and sand can damage the seals of the hydraulic system and so shorten its life considerably. We recommend you to protect the suspension element from dirt with an elastic cover that you can buy at your local dealer when riding on dirty roads regularly.

From time to time grease the thread for the spring pre-load with a drop of acid-free oil. Thus, you can always turn the adjustment ring easily by hand. Once a year you have to grease the pivots of the suspension element. For that purpose, dismount the suspension element as described under "Changing the spring" on page 75.

Remove the plastic spacers and pull the metal tube out of the bushing. Lubricate the bushing and the tubes with grease. Finally remount the suspension element.

Hydraulic dampers are affected by wear and tear through normal use. It depends on the usage of the tricycle, the amount of dirt on it and the maintenance and lubrication. After 3000 km the damper must receive an inspection by a trained mechanic, worn out parts or the hydraulic cartridge can be replaced then. Due to wear of the seals oil can leak from the damper. The internal oil can become foamy. This may lead to some noise when the damper is working. This noise does not affect the function of the damper. Only if there is no obvious damping after the first 5 mm of travel, the damper should be replaced.

Please also note the maintenance instructions of the damper manufacturer provided with your tricycle.



The bushings of the rear spring element need to be lubricated once a year.

Air shock ROCKSHOX Monarch

Attention! Please follow the instructions in the separate manual provided by the rear shock manufacturer.

This rear shock contains pressurized air in a main („positive“) air chamber as suspension medium. Air shocks are lighter than steel spring rear shocks. Another advantage is that the spring stiffness can be easily adjusted with an air pump: By increasing the pressure the spring becomes harder.

Air shocks have progressive spring behaviour, whereas steel springs have linear spring behaviour. This means that the air shock gets progressively harder, e.g. it is much stiffer when fully compressed than when only slightly compressed.

The advantage of this progressive spring behaviour is the good bottom-out protection when heavily loaded.

The valve for the air chamber is located at the back end of the air shock. The valve is protected by a metal valve cap.

To pump up the air shock you need a special air pump designed for bicycle air shocks. It

must feature a fitting Schrader valve adaptor and a pressure indicator.

When attaching or removing the pump to/from the valve, you will lose some air pressure (about 0,5 – 1,0 bar). Take off the pump quickly.

Recommended pressure setting on Scorpion /fx26 /fs 26 /fs 26 Enduro /fs 26 S-Pedelec /plus 26

Load	pressure
• *up to 80 kg (183 lbs)*	*7,5 bar*
• *up to 110 kg (242 lbs)*	*9,0 bar*
• *up to 140 kg (308 lbs)*	*10,5 bar*

on Scorpion fx20 /fs 20 /plus 20

Load	pressure
• *up to 80 kg (183 lbs)*	*6,5 bar*
• *up to 110 kg (242 lbs)*	*7,0 bar*
• *up to 140 kg (308 lbs)*	*9,0 bar*

Maximum allowed pressure: 18 bar.

⚠ **Danger!** Take care that the rear wheel or mudguard or suspension element never hit the frame, seat or rear rack box while the suspension is fully compressed. Therefore, fully deflate the air shock. Have a second person sit down on the tricycle and make the suspension bottom out by pushing on the seat or the rear rack.
If the distance between the wheel or mudguard and the frame, seat or rear rack is smaller than 1 cm you will have to have your tricycle dealer mount an additional spacer inside the air shock. In case you don't, the mudguard may break suddenly or the rear wheel might be blocked which can lead to serious crashes.

Adjusting the damping

By adjusting the damping, you can adjust the performance of the suspension precisely to your individual riding situation. A rough street with many harsh bumps that occur in a row or even cobblestones needs a low damping rate while a road with long stretched bumps that occur more regularly needs a stronger damping to achieve a smooth road holding.

When you add a lot of luggage you will need to adjust the spring stiffness; in that case an adjustment of the damping may even give you more riding comfort.

Finally, the oil used in the damper becomes thicker and more viscous at lower temperatures, which can be compensated through a change in the damper setting.

Please note that you can seriously spoil the riding comfort by a bad damper setting, especially caused by unsystematic playing with the knobs that may result in much to high damping values. In the worst case the suspension element will neither compress nor decompress. If you are in doubt, please consult your local dealer.

The rebound damping prevents an eventual "jumping" of the rear wheel and provides a good traction. By improving the road surface contact the suspension of the recumbent tricycle also increases your riding safety.

Rear suspension element



Air Shock ROCKSHOX Monarch damping is adjusted with the red knob at the rear end. Watch correct mounting direction depending on your model! (Lever facing upwards: Scorpion /fx26 /fs 26 /fs 26 Enduro /fs 26 S-Pedelec /plus 20 /plus 26; downwards: Scorpion fx /fs 20)

A higher damping value prolongs the time until the decompression movement is finished. Only then can the suspension compensate the next shock with the full suspension travel. Therefore, when you ride on very bumpy streets with shocks that occur fast in a row you might want to use a lower damping value.

A good setting for maximum comfort is achieved when the rear wheel decompresses completely after a shock and then oscillates only once. In order to check the adjustment, you will need a second person that compresses the suspension by pushing the tricycle down while you are sitting on the tricycle in the riding position. The other person can then observe the suspension movements.

In order to adjust the damping during decompression, turn the adjustment knob on top of the rear end of the suspension element.

If you turn the knob in direction of the „-“, you will get less damping and thus faster decompression. Turning the knob in direction of the „+“ will give you more damping and thus slower decompression.

⚠ **Attention!** When mounting the Air shock to the frame, take care to place it in correct position: The lever must not get in contact with the frame or swingarm when the shock is being compressed.
On Scorpion /fx26 /fs 26 /fs 26 Enduro /fs 26 S-Pedelec /plus 20 and plus 26, the blue lever must be on the rear facing upwards.
On Scorpion fx 20 and Scorpion fs 20 the blue lever must be on the rear facing downwards.

Front suspension elements

Adjusting and maintenance on the front suspension of Scorpion fs 20 / fs 26 / fs 26 Enduro / fs 26 S-Pedelec / plus 20 / plus 26

Danger! While adjusting the front suspension, never load the tricycle, e.g. by resting on the seat or loading the racks when your hands or tools are close to the suspension struts. Your hands may be bruised when the suspension compresses.

Full suspended tricycles of HP VELOTECHNIK are equipped with a suspended front axle. It is designed as a so called McPherson strut. That means, the left (or right) suspension strut's upper end is supported in the frame while it is linked to a single wishbone on its bottom end. The front wheel is directly attached to the suspension strut, which is the knuckle at the same time.

Inside the suspension strut a steel spring is combined with MCU-elastomers. The front suspension is damped by friction between stanchion tube and a circular elastomer band situated between the bushings as well as by friction inside the elastomers.

To decrease body roll in during fast cornering and to provide high comfort at the same time, the front axle is equipped with a stabilizer bar. This bar is linked elastically with both wishbones and the main frame. As the stabilizer bar works as a torsional spring, it supports the outside wheel's suspension while cornering.

For maximum comfort, 30 % of the suspension travel should be used when you sit on your tricycle in a normal driving position (the same is valid for the rear suspension). This means 20 mm of travel (so called "sag").

Your tricycle has reached a sag of 20 mm when the upper edge of the knuckle which you can feel underneath the shock boot coincides with the lower edge of the head tubes of the main frame. You can fine tune this sag according to your weight and your additional luggage by adjusting the preload of the springs. To change the spring rate in a wider range, you can replace the steel spring or interchange elastomers and spacers inside the suspension struts. For further instructions, please see the chapter "Adjusting the suspension" on page 72. To adjust the preload of the front suspension, unscrew the strut end cap using a hex key size 5. Now the preload adjuster is visible, which can be turned by a hex key size 5, too.



Hex head screw for adjustment of the pre-load for the spring inside the knuckle

Turn the preload adjuster counter clockwise to decrease preload, turn it clockwise to increase preload. The maximum depth is limited, so stop turning when resistance rises suddenly. After adjusting, place the cap on the strut and tighten it gently (1 – 2 Nm).

Danger! The mounted spring is under tension. Do not remove the preload adjuster when adjusting the spring preload. Make sure the adjusting disc's thread is fully screwed into the stanchion tube. Otherwise, it may become loose and hurt you.

Front suspension element

The damping rate can be altered by exchanging the elastomer bands inside the suspension struts, see "Removing and disassembling the suspension struts".

Customizing the front suspension

The front suspension can be customized by different measures:

- - adjusting the preload (see page 22)
- - exchanging the elastomers or spacers
- - exchanging the steel springs
- - exchanging the stabilizer bar
- - exchanging the damping elastomer bands

According to your order, the tricycle comes with standard suspension setup either up to 90 kg or above 90 kg.

Standard suspension setup up to 90 kg (curve 2):

- - steel spring soft (red)
- - 4 MCU elastomers 30 mm
- - 1 spacer 30 mm
- - stabilizer bar soft (white)
- - low damping rate (elastomer bands 1,6 mm)

Standard suspension setup above 90 kg (curve 1):

- - steel spring hard (yellow)
- - 4 MCU elastomers 30 mm
- - 1 spacer 30 mm
- - stabilizer bar hard (blue)
- - low damping rate (elastomer bands 1,6 mm)

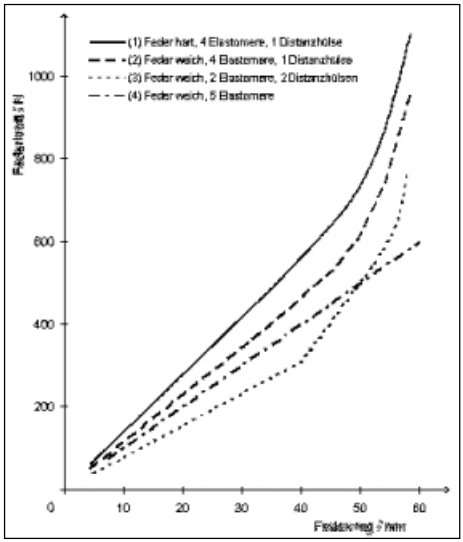
Enclosed for individual setup:

- - 2 MCU elastomers 30 mm
- - 2 spacers 30 mm
- - 2 elastomer bands 1,7 mm, high damping rate

These standard setups can be customized. As an example, you can find curves of different options in the diagram. The curve shape shows the characteristic of the suspension setup.

The characteristic is referred to as linear when the curve of suspension force related to suspension travel forms a straight line. Force and travel are related to each other by a constant factor, called spring rate, throughout the whole suspension travel. This is a typical characteristic of steel springs.

The characteristic is referred to as progressive (or rising rate) when the spring rate increases with suspension travel. In the diagram, this results in a curve with a left bend. Due to their design, elastomers and air springs show this characteristic (MCU elastomers show an almost linear characteristic in the first part of their travel, see curve no. 4).



The tuning of your suspension bases on the choice of the steel spring according to your usual load. The soft spring moves the area of operation to low rider and luggage weight, the hard spring to high rider and luggage weight. The suspension characteristic is not affected by choosing another steel spring with different spring rate. Varying the number of elastomers and their relation to the number of spacers

inside the steel spring changes the area of operation as well as the suspension characteristic. It is allowed to have one or more blank spaces out of the five spaces available for elastomers or spacers. In this case the load during the first part of the travel is only taken by the steel spring and the elastomers only affect the suspension after the travel of the blank spaces is used up.

Attention! Do not install more than two spacers in one strut, otherwise the full suspension travel can not be reached. Spacers should always be installed at the top of the stack inside the spring to give room for the screw in the top cap. The setup must be similar in both suspension struts of your tricycle.

Attention! The suspension must be set up in a way that avoids permanent bottoming out (a clearly recognizable bumping into the end stops). Permanent bottoming out may reduce the components' life time.

If you use your tricycle under different conditions and changing loads as well as on good and bad surfaces, a setup with a progressive characteristic for the whole travel is recommended to get a comfortable suspension under all conditions of use. The elastomers support the steel spring from the beginning. By changing the relation between the number of elastomers and number of spacers, you can influence the suspension characteristic and the maximum force the strut can bear before it bottoms out. Examples in the diagram are the curves no. 1 and no. 2 which show the standard setups. They feature moderate progression and increased maximum load compared to a single steel spring. (Setup: spacer-spacer-elastomer-elastomer-elastomer)

Will your tricycle always face the same load and only high quality roads, for example, you may tune your suspension characteristic to a more linear behaviour in the first two thirds of travel and a high progression in the remaining third. The linear part provides very high comfort. The progression at the end prevents the strut from frequently bottoming out due to unusual high loads.

A characteristic like this (3) can be achieved by a steel spring which is responsible for taking all the load at first and will be supported by only a few elastomers towards the end of travel. (Example setup: empty-spacer-spacer-elastomer-elastomer)

To exchange elastomers or spacers, the end cap and the preload adjuster (which is under tension) must be removed. Having done so, the steel spring and the inside elastomers and spacers can be taken out. The lower support of this suspension package is an axial bearing which consists of three parts. This bearing or its parts may stick to the spring (caused by lubricant). Make sure this axial bearing is mounted under the spring in the correct order (washer-bearing-washer) during reassembly. If there are elastomers left in the strut, a thin needle pricked into will help to remove them. Now the springs, elastomers, and spacers can be recombined. When screwing in the preload adjuster disc, make sure it is aligned straight. It must be screwed in against spring force, therefore the assistance of a second person might be asked.

Attention! Make sure that the axial bearing was mounted correctly between spring and support plate inside the strut during assembly. A missing or wrongly placed axial bearing may damage the suspension strut or lead to steering heaviness.

Front suspension element



Stabilizer bar

To decrease body roll while cornering, the axle is equipped with a stabilizer bar. As long as the spring deflection height is the same on both front wheels, the stabilizer bar has no effect. If one single wheel is moving upwards (e.g. the outside wheel due to the dynamic forces at high speed cornering), the stabilizer bar works as a torsional spring and increases the spring rate of this wheel. Besides, it transmits parts of this wheel's load to the opposite wheel's suspension strut which then supports the higher-loaded wheel. As a result of this the single-sided suspension on bad quality roads will be harder compared to both wheels moving at the same time in the same direction.

If you prefer a very comfortable ride, it is possible to mount the soft (white) stabilizer bar in spite of high loads and appropriate spring setup. However, the trike will lean more outwards in fast driven corners.

If you prefer a sporty style of riding with a minimum of body roll, you may also use the hard (grey) stabilizer bar with a soft spring setup.

To remove the stabilizer bar, simply unscrew both bolts which connect the stabilizer bar brackets to the frame plates. Now the stabilizer bar can be pulled out of its bushings in the wishbones. Assembly is done in reversed order.

Attention! Before inserting the countersunk bolts, make sure the brackets are fitted planar to the frame plates and the hole centres are aligned to each other. Otherwise, you may damage the threads and destroy the brackets.

Removing and disassembling the suspension struts

To provide a long lasting, faultless function of the front suspension, the struts must be maintained regularly according to the service plan on page 105. During design, great importance was attached to keep the bearings of the front suspension free from dirt and moisture. That's why the struts are equipped with a shock boot with vent holes situated inside the frame's steering tubes. This makes sure that predominantly clean and dry air is exchanged. Depending on the area and conditions the tricycle is operated in and under, dirt and moisture could nevertheless reach the bearings inside. Hence it is necessary, especially after riding under rainy and snowy or off road conditions, to check the struts for dirt and clean them. Under extreme conditions, we recommend to shorten the maintenance intervals given in the service plan.

Danger! While adjusting the front suspension, never load the tricycle, e.g. by resting on the seat or loading the racks when your hands or tools are close to the suspension struts. Your hands may be bruised when the suspension compresses.

Attention! Use aging-resistant, lithium soap-based grease to lubricate. Never use grease containing solid lubricants such as zinc sulphide or molybdenum disulphide.

Front suspension element

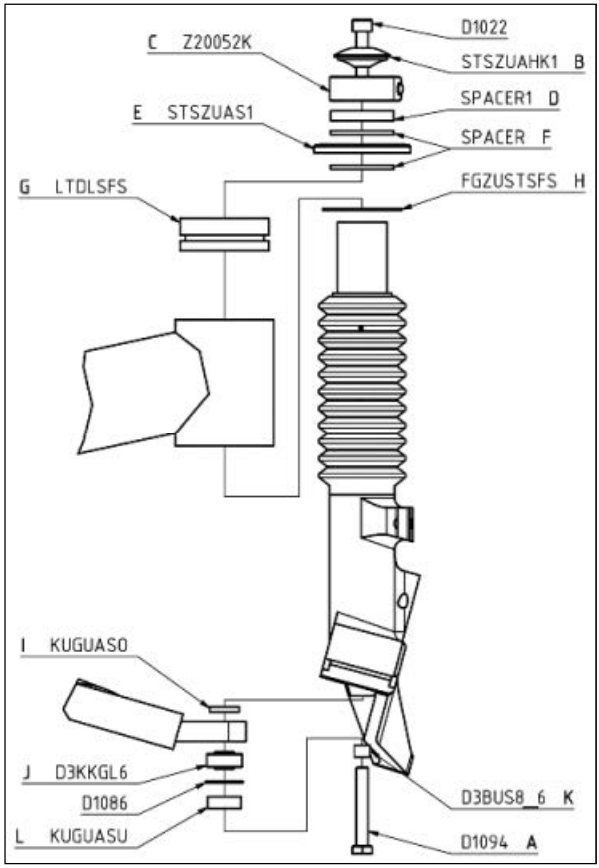
Attention! Never clean your tricycle and especially parts of the suspension with a pressure washer or steam cleaner. These devices remove lubricant and transport dirt into the bearings which causes higher wear.

To clean the suspension strut occasionally, clean the shock boot and slide it down completely. Clean the stanchion tube thoroughly with a soft, dry cloth. Apply a thin layer of grease or suitable oil. Finally, slide back the shock boot to its original position.

To maintain the suspension strut according to the service plan or to exchange the elastomer bands for damping adjustment, it has to be removed and disassembled.

Preparation

1. Remove any coarse dirt from around the strut.
2. Fit the tricycle to a work stand in a way that provides easy access to the front wheels.
3. Dismantle the front wheel, fender and stabilizer bar as described in your tricycle's original owner's manual and the brake caliper according to the brake manufacturer's instructions



4. Unscrew the outer rod end of the track rod from the suspension strut. It may be necessary to push the lower edge of the rubber cap upwards to make the screw accessible.

Attention! Always secure the wishbones or track rods by tying them to the frame (e.g. using zip ties) to make sure they won't move until their stop. This would damage the spherical plain bearings and rod ends.

Removing the suspension strut

1. Unscrew the hex bolt M6x40 A at the strut's lower end, which connects the strut with the wishbone.
2. Loosen the clamp C, unscrew the fastening screw and remove the end cap B at the top of the suspension strut.
3. Remove clamp C as well as the spacer D, spacer F, cap E and second spacer F below.
4. Pivot the strut in a way that it may pass the wishbone. In case the strut won't pass the wishbone, you have to dismount the wishbone's rear pivot point.
5. Push the strut downwards to slide it out of the rubber strut bearing G.
6. Slide off the washer H at the suspension strut's upper end.

Removing the rubber strut bearing

Attention! Make absolutely sure that there are no parts of your body in the direction of pressure of the screwdriver. There is a very high risk of slipping and serious injury!

1. Insert the blade of a wide slotted screwdriver (approx. 6 – 8 mm) between the top of the rubber strut bearing and the head tube.
2. Hold the blade at an angle towards the inside - bottom and lever the rubber strut bearing out of the head tube. Be careful not to lift over the edge of the coating to avoid damaging it.

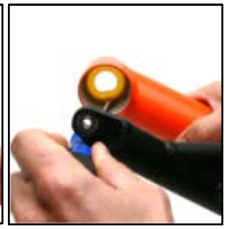




Fitting the rubber strut bearing

1. Insert the rubber strut bearing into the head tube from the top until it rests on the collar in the head tube. Make sure the wide sleeve is facing up.
2. Using your thumb, press down on the rubber strut bearing at a point on the side that protrudes upwards at an angle inwards - downwards.
3. Hold the opposite edge of the rubber strut bearing with your other hand to prevent it from slipping out of the head tube. If necessary, use a wide screwdriver and push the blade of the screwdriver into the groove of the shock rubber to move it diagonally inwards and downwards.
4. Push the rubber strut bearing all the way down until the collar of the head tube is completely in the groove of the rubber strut bearing.

Attention! When using a screwdriver never hold the opposite edge of the rubber strut bearing with your hand as the screwdriver could slip and cause serious injury. Use a tool to hold it in place.

5. Insert the screwdriver from below between the inner wall of the head tube and the rubber strut bearing.
6. Pull the inserted screwdriver once completely around the perimeter of the rubber strut bearing (lifting it slightly) to ensure that the groove fully encloses the collar.

Disassembling the suspension strut

1. Cut the zip tie at the bottom of the shock boot 1, remove the shock boot from its upper ring guide and pull it upwards.
2. Screw in hex bolt A on the underside of the strut for approximately 4 mm, but leave more than 4 mm of space between the bolt head and the strut.
3. Grab the suspension strut firmly at the knuckle 2 (lower black part) and beat the screw head with a rubber hammer to release the piston 6 inside.




4. Remove the hex bolt A and slide the stanchion tube 3 (golden) out of the knuckle.
5. The damping strip 8 can now be removed.
6. Clean the sliding surfaces of the stanchion tube and the bushings 4, as well as the inside of the knuckle 2. Use a clean soft cloth. If there is noticeable play in the bushings or if the bushings are damaged, please get in touch with your HP VELOTECHNIK Contact.
7. Lubricate the surfaces of the clean bushings 4. Check the proper position of the bottom out elastomer 5 inside the knuckle.
8. Apply a thin layer of grease on the stanchion tube 3.

Attention! Use aging-resistant, lithium soap based grease to lubricate. Never use grease containing solid lubricants such as molybdenum disulphide or zinc sulphide.

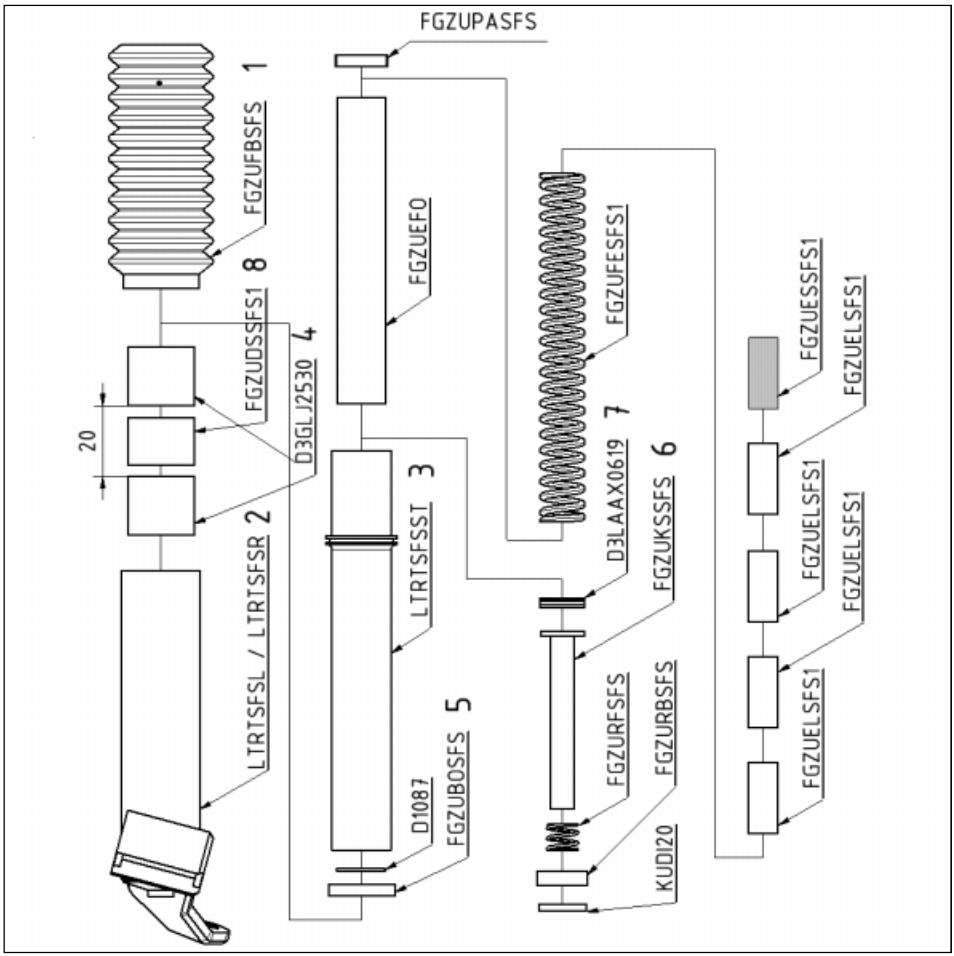
Installation and assembly of the suspension strut

1. Insert the teflon sheet without wrinkles in the knuckle between the two bushings and slide the stanchion tube back into the knuckle.
2. Slide on the shock boot and insert its upper end into the stanchion tube's groove. Apply a new zip tie to its lower end.
3. Slide the washer H onto the stanchion tube from above.
4. Press the suspension strut into the elastomer bearing G in the frame.
5. Assemble spacer F, cap E, second spacer F, spacer D, clamp C, and end cap B.
6. Pre-tension the cover cap in the guide with the fixing screw to 1-2 Nm and then tighten the clamp.
7. Connect the suspension strut with the spherical plain bearing in the wishbone by the M6x40 hex bolt A (part order: strut – thin sealing ring I – pivoting bearing J – spacer 6 mm long K with thick sealing ring L – screw head A). Tighten the screw with a torque of 9 – 10 Nm. By doing this, the piston 6 is locked at the lower end of the suspension strut in its correct position. If you are not able to fasten the screw (i.e. it can be turned on and on), you have to disassemble the springs (see "Customizing the front suspension" in the original owner's manual, the axial bearing 7 may remain inside) and fix the piston with a long hex key size 5.

Front suspension element

When mounting the rod end at the suspension strut, take care to assemble the parts in the correct order, from upside: screw head, steering lever, washer 6, spacer 6 mm length, rod end, selflocking nut M6. In case you have removed the rubber cap, circlip pliers will help you to reassemble.

Attention! Use thread locker with all bolted connections that are not equipped with self-locking nuts, else the connections may become loose.



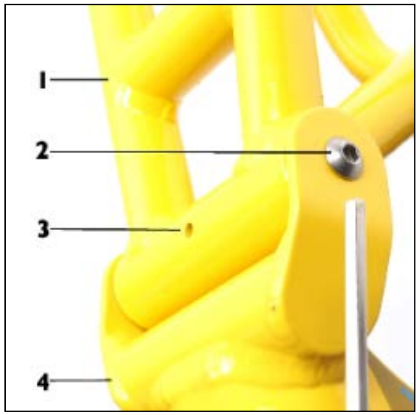
Swingarm pivot

Swingarm pivot on Scorpion models

The rear swingarm pivot comes with maintenance free bushings. They feature a self-lubricating system with Teflon particles. They sustain a very high load and they show almost no wear.

In case you notice play or a creaking noise at the rear swingarm please check the two screws that fix the axle in the frame.

Danger! If the screws at the axle are not tight enough this leads to play and noises. In extreme cases the swingarm may come loose which leads to a serious fall. Secure the axle screws with medium-strength threadlocker. Tighten the axle bolts with a torque of 17–19 Nm.



Swingarm mounting on a Scorpion fs 20:
1 - rear swingarm
2 - axle srew
3 - hole for anti-rotation
4 - main frame

The bushings are exchangeable. For that purpose, you will have to dismount the rear swingarm and send it together with the axle via your specialist dealer to HP VELOTECHNIK. After installation the bushings are machined to adjust them.

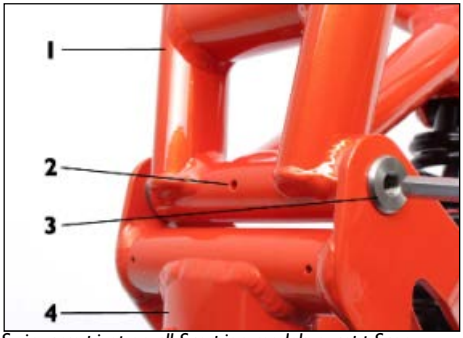
Loosening the axle screws

On the Scorpion fs 20 model, with loosening the axle screws you also loose other mounted parts, e. g. rear rack or battery rail.

The other Scorpion models use a special axle screws that is equipped with an Allen socket and an internal thread. The Allen socket is located on the inside behind the internal thread. All attachments and the mounting screw must first be removed in order to access the Allen socket and loosen the axle screws.

With a mounted rear rack, completely unscrew the two fastening screws of the lower rear rack mount, slightly loosen the screws of the upper mount and swing the rear rack upwards.

Swingarm pivot



Swingarm pivot on all Scorpion models except Scorpion fs 20:
1 - rear swingarm
2 - hole for anti-rotation
3 - axle srew
4 - main frame

To disassemble the rear swing arm, the axle can be secured against rotation by inserting a thin metal rod (e.g. a 3 mm hex wrench) through the hole of the rear swingarm under the axle into the receiving hole of the axle. Then loosen the two axle screws and unscrew them completely.



You can prevent the axle from turning by inserting a thin metal rod in the receiving hole of the axle.

<u>Mounting the rear swing arm</u>

When tightening the axle screws, make sure that the axle does not rotate (by using the rod as described above in the chapter „Loosening the axle bolt"). If you are unsure or in doubt, contact your specialist dealer.

Danger! If the screws at the axle are not tight enough this leads to play and noise. In extreme cases the swingarm may come loose which can lead to a serious fall. If the screws are too tight the thread of the axle may tear out or the screw may be damaged.
Secure the axle screws with medium-strength threadlocker. Tighten the axle bolts with a torque of 17–19 Nm.

Attention! Make sure there is a big washer between main frame and bushing on each side in order to provide proper function.

Mudguards

Mudguards are exposed to very strong vibrations, especially at suspended wheels, which may cause them to break. Please check the stays and mountings of the mudguards regularly for their position and check the mudguards themselves for cracks or deformations. Replace damaged mudguards immediately.

Front mudguards

If the wheels are removed, the tricycle must not rest on the front mudguards. Loosen the screw between mudguard mounting and knuckle to remove the mudguard.

The front mudguards are adjustable in height to accommodate different tire heights by means of the slotted holes in the mudguard mounting.

After having performed service work or after replacing mudguards check if the wheels turn freely. There has to be a distance of at least 7 mm between mudguard and wheel.

Check whether the suspension can still be completely compressed with mounted mudguards. The mudguards, stays, mountings, and screws must not touch other parts under maximum compression.

Danger! If branches or other obstacles get caught in the wheels while riding and are moved around they may drag the mudguards along. The mudguard can possibly fold up between frame and tire and hence block the wheel, which may lead to a serious fall. If you hear any unknown noises while riding stop immediately and remove anything that might cling to the mudguards or the wheels.

Attention! You must not mount additional parts like rear lights or reflectors to the mudguards since those may break then. Retrofit mudguards are aligned at HP VELOTECHNIK before they are sent out. After assembling them to the tricycle a final alignment must be performed.

Front mudguard mounting on Scorpion fs 20 / fs 26 / fs 26 S-Pedelec / plus 20 / plus 26

The front mudguard mounting is attached to a bracket on the suspension struts. The sheet metal mounting bolts (facing the wheel) must be fastened with 7 – 9 Nm.

To remove the mudguards, unscrew the sheet metal mounting bolts until the sheet metal can be pulled out. Secure or remove the sheet metal mounting bolts.

Retrofit mudguards are aligned at HP VELOTECHNIK before they are sent out. After assembling them to the tricycle a final alignment must be performed.

Danger! Make sure that the sheet metals are fastened with the correct tightening torque (7 – 9 Nm) and the screws are secured with retaining washers and thread locker. Frequently check the assembly. If a sheet metal becomes loose, the fender may be caught by the wheels and lock the wheel or flung away. This may lead to serious injury or fall!

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Front mudguard mounting on Scorpion / Scorpion fx20 /fx26 and Gekko models

The front mudguard mounting is attached by headset's cap and screw and fastened against the headset clamp. Make sure this clamp is fastened properly.

The little screw (1) in the mudguard mounting fits in the clamping slot (2) of the headset clamp and secures the mounting against turning.

If you decide to uninstall the mudguards, replace the mudguard mounting with a 5 mm spacer.



Mounting of front mudguards on Scorpion, Scorpion fx, Gekko fx 20, Gekko fx 26, and Gekko 26

Water bottle cages

The derailleur tube at the front of the frame comes with threaded inserts M5 for a water bottle cage.

Additional water bottle cages can be mounted using a special bracket behind the seat available from HP VELOTECHNIK.

A useful alternative to water bottles are systems with a "water bag" and a drinking hose, e.g. from CAMELBAK. You can simply strap them behind the seat or on the rear rack.



Gekko fx 20 with water bottle cages mounted

Maintenance routine

Your tricycle is equipped with the latest bicycle technology that does not require much maintenance.

However, you will have to maintain your bicycle regularly, as it is with other vehicles too. At least once a year the bicycle has to be taken to a bicycle mechanic for an overall service. Only this way a long lasting and safe function of all parts of your bicycle can be guaranteed. It maintains the value of your bicycle as well as the fun and the safety while riding for many years.

Read in this chapter how to perform smaller maintenance and care works between the services.

For a quick overview of the works to be done take a look at the Service plan on page 106.

Attention! The maintenance works on this recumbent partly require special tools and skills. Do only work within your limits and, in the interests of your own safety, do not go beyond. Should you be uncertain at any point, get in contact with your local dealer.

Wear and tear

As on many other vehicles, some parts on a bicycle are affected by wear and tear. The lifetime expectation of these parts depends on the intensity and type of use as well as on the maintenance and care. Please keep in mind that the process of wear and tear is normal and no reason for a warranty claim against your dealer or HP VELOTECHNIK.

You will find more specific information on wear and tear in the chapters on the relevant parts.

Cleaning and conservation

The frame of your recumbent tricycle has a high quality and environmentally friendly powder coating. The surfaces of the aluminium parts are either polished or anodised. Threads and technical contact areas can be unfinished and must be protected with wax.

To keep the surfaces brilliant over many years and to protect them effectively against corrosion the bicycle has to be cleaned from dirt and then conserved.

Dried sweat but also environmental influences such as air pollution, dirt on the roads and especially grit affects the parts, and not only may this cause flaws but also serious structural damage of the parts by corrosion.

In contrast to a widespread belief particularly the "non-rusting" aluminium is dramatically affected by grit! This kind of damage may not be visible in the beginning but it leads to a serious danger when the part breaks. Clean and conserve your bicycle diligently!

The best things to clean your bicycle are warm water and a soft cloth. If your bicycle is very dirty first take a wet sponge to soften the dirt and then remove it. In case of bad grease or oil stains you should use a neutral, non-regreasing rinsing agent.

While cleaning your bicycle check it for any cracks, scratches, deformations, damaged parts, loose spokes etc. If you are in doubt, please consult your local bike shop.

Attention! Do not use any cleansing agents that scrub or are chemically aggressive since they affect the paintwork. Before using any cleansing agent please test it at a part of your bicycle that is not immediately visible.

Attention! Do not use any high-pressure cleaner. The strong jet of water goes through the seals of the bearings, blows away the lube and causes corrosion of the bearing parts and the chain. In addition to this it may damage stickers.

Attention! Any damage of the paintwork has to be cleaned from rust and repaired immediately, else the damaged part in the frame gives way to corrosion that nests in the surrounding paintwork. This can result in damage of the frame.

In case of small scratches at the surface of the powder coating of the frame or the surface of the seat you can simply polish them away. You can buy a special polishing agent for epoxy resins at a specialist dealer for boat building. Do not use a polish for metal!

After cleaning the tricycle, dry it and treat the paintwork and the metal surfaces with wax. You can purchase this wax from your local bike dealer as a convenient spray.

The wax passes moisture and flows into tiny gaps and pores. After some minutes the solvent evaporates and leaves a dull and glutinous film. Now polish the waxed parts of your bicycle with a soft cloth to make it real shiny.

Do not only wax the frame but also the spokes, hubs, screws and nuts etc. You can also conserve the chain with wax spray after lubricating it, see also the chapter on "Chain", page 57.

The frame has small holes for ventilation that prevent condensation in the frame. These holes must not be sealed. However, moisture may enter the frame through the holes. Therefore, protect the inside of your frame by applying wax spray through the holes.

Protect the parts where cables or chain tubes may scratch the frame. You can buy special stickers at your bike dealer or extra strong transparent tape at your do-it-yourself-store. That way you avoid scratches in the powder coating and coating coming off.

Attention! Take care that after folding the tricycle there are no parts rubbing against the frame. This may damage the paintwork.

Storing the bicycle

Before storing your bicycle over a longer period of time, e. g. during winter, please take care of the following steps:

- Clean your bicycle and protect it from corrosion as described in the chapter on "Cleaning".
- Store your bicycle in a dry and warm place.
- Avoid direct sun and storage close to the heating since it affects the rubber of your tires.
- Choose the smallest sprocket and the smallest chain ring. That way the cables are in the most relaxed position.
- The tubes of your tires lose air when standing over a longer period of time. If the bicycle then rests on flat tires, the tires may be damaged. Therefore, hang up your bicycle or check the air pressure regularly.

The winter months are a convenient period of time for the annual service since then you won't have to wait long for an appointment. Many dealers offer special prices for the winter check.

Transport in the car

The best way to transport your tricycle is inside the car. Take care that it does not lie on the derailleur.

If you want to transport it outside the car we recommend a roof-rack or a rear carrier. Take care to fasten your tricycle at the frame only.

Please remove any parts that could come loose during transport (seat cushion, water bottles, luggage bags, pumps, pennants, etc.).

Disposal

Please inform yourself about the current regulations for the disposal of a bicycle or pedelec at your place of residence. If necessary, single parts (e. g. electrical parts, batteries, tyres and inner tubes) must be disposed of separately.

Pedelec batteries must never be disposed of with household waste, but can be disposed of in a specialist shop or at a local local collection point.

Tightening torques

Table of tightening torques for all Scorpion models

The values indicated are meant for a friction value μ=0,125 (greased threads and screw heads). They only refer to the indicated parts. Please do always follow the values given in the manuals of the parts manufacturers since the following values may not be up to date due to changes in the product line!			
part	**connection**	**screw**	**tightening torque**
V-brake			
- brake lever	handlebar/grip	M6 SIZE 5	4 Nm
- brake calliper	- calliper/frame	M6 size 5	5 – 7 Nm
	- cable clamping	M6 size 5	6 – 8 Nm
disc brake			
- brake lever	handlebar/brake lever clamping	M6 size 5	4 Nm
- brake calliper	calliper/frame	M6 size 5	7 – 9 Nm
- brake disc	disc/hub	M5 Torx T25	5 – 6 Nm
- brake tube	brake tube/brake lever	size 8	4 Nm
folding hinge	locking wedge screw	M6 size 4	6 Nm
suspension element	frame/susp. element/swingarm	M6 size 4	6 – 8 Nm
rear rack	at the seat tube	M6 size 5	7 – 9 Nm
swingarm	axle/frame	M12x1 size 6	17 – 19 Nm
bottom bracket	cartridge/frame		50 – 60 Nm
chain idler	chain idler/frame	M8 size 6	17 – 19 Nm
crank	crank/axle	size 8	35 Nm
	chain ring screws	size 5	8 – 11 Nm
hub	cassette ring		38 – 42 Nm
	screw axle	size 15	*
	quick release axle		See page 12
	front wheel hub	M8 size 5/6	8 – 10 Nm
pedal	pedal/crank	size 15	35 – 40 Nm
shifting lever	twist shifter	size 3	2 – 2,5 Nm
	barend shifter	size 6	5 – 6 Nm
derailleur	derailleur/frame	size 5	8 – 10 Nm
	cable clamping	size 5	4 – 6 Nm
mud guard	stays/frame	M5 size 4	4 – 5 Nm
seat	upper seat/seat mount	M6 size 4	5 – 6 Nm
	lower seat/seat mount	M6 size 4	3 – 4 Nm
battery mounting rail	battery adapter/battery mounting rail	M5 size 3	5–6 Nm
	battery adapter/battery mounting rail	M6 size 4	7–9 Nm
frame	front boom clamping	M8 size 6	11 – 12 Nm
front derailleur	front derailleur/frame	M5 size 5	5 – 6 Nm
	cable clamping	M5 size 5	4 – 6 Nm
handlebar	handlebar/stem	M6 size 5	8 – 10 Nm
stem	main axle/bearing	size 6	6 – 8 Nm
front axle	A-Head-cap	M6 size 5	1 – 2 Nm
	clamp on stanchion tube	M6 size 5	7 – 9 Nm
	steering rod/knuckles	M6 size 5	7 – 9 Nm
	wishbone/strut	M6 size 10	9 – 10 Nm
	wishbone/main frame	M8 size 5	13 – 15 Nm
	wishbone/main frame	M6 size 4	7 – 9 Nm

*Please follow the torque specifications of the hub manufacturer in the original manufacturer manual. You will find the part number on the hub.

Tightening torques

Tightening torques for Gekko models

The values indicated are meant for a friction value μ=0,125 (greased threads and screw heads). They only refer to the indicated parts. Please do always follow the values given in the manuals of the parts manufacturers since the following values may not be up to date due to changes in the product line!			
part	**connection**	**screw**	**tightening torque**
V-brake			
- brake lever	handlebar/grip	M6 size 5	4 Nm
- brake calliper	- calliper/frame	M6 size 5	5 – 7 Nm
	- cable clamping	M6 size 5	6 – 8 Nm
disc brake			
- brake lever	handlebar/brake lever clamping	M6 size 5	4 Nm
- brake calliper	calliper/frame	M6 size 5	7 – 9 Nm
- brake disc	disc/hub	M5 Torx T25	5 – 6 Nm
- brake tube	brake tube/brake lever	size 8	4 Nm
rear rack	at the seat tube	M5 size 4	5 – 6 Nm
bottom bracket	cartridge/frame		50 – 60 Nm
chain idler	chain idler/frame	M8 size 6	17 – 19 Nm
crank	crank/axle	size 8	35 Nm
	chain ring screws	size 5	8 – 11 Nm
hub	cassette ring		38 – 42 Nm
	screw axle	size 15	*
	quick release axle		see page 12
	front wheel hub	M8 size 5/6	8 – 10 Nm
pedal	pedal/crank	size 15	35 – 40 Nm
shifting lever	twist shifter	size 3	2 – 2,5 Nm
	barend shifter	size 6	5 – 6 Nm
derailleur	derailleur/frame	size 5	8 – 10 Nm
	cable clamping	size 5	4 – 6 Nm
mud guard	stays/frame	M5 size 4	4 – 5 Nm
battery holder rail	seat frame/battery holder rail	M5 size 3	4 – 5 Nm
frame	front boom clamping	M8 size 6	11 – 12 Nm
front derailleur	front derailleur/frame	M5 size 5	5 – 6 Nm
	cable clamping	M5 size 5	4 – 6 Nm
handlebar	handlebar/stem	M5 size 4	4 – 6 Nm
stem	stem/axle	M5 size 4	4 – 6 Nm
headset	headset clamp	M6 size 5	4 – 6 Nm
track rods	track rod/knuckles	M6 size 5	7 – 9 Nm
	counter nut	size 10	4 – 5 Nm

*Please follow the torque specifications of the hub manufacturer in the original manufacturer manual. You will find the part number on the hub.

Warranty

Warranty policy

Your authorised dealer has to fully set up and adjust your bicycle, so that safe function is guaranteed. The dealer has to make a final safety check and carry out a test ride.

Your cycle dealer is obliged by law to ensure, among other things, that your bicycle is not affected by defects which materially diminish its value of suitability for the described purpose. The exact details will vary according to the country. In Germany, this liability ends two years after purchase.

In addition to this HP VELOTECHNIK offers a 10-year warranty on the frame against damage through material or manufacturing defects. This warranty applies only to the original purchaser.

Warranty is only valid for original parts from HP VELOTECHNIK. In case of warranty we will replace or repair the damaged part with a part of our choice or a new part equal to the old one (warranty obligation). We do not cover any transport, labour or any secondary costs.

Damage caused by wear and tear, corrosion or damage at the surface coating is excluded.

Damage caused by inappropriate use, inadequate care and maintenance, falls, crashes, overloading through excess weight, incorrect assembly or modifications to the tricycle is also not covered.

The warranty is void when using the bicycle for commercial purpose such as rental or leasing. Bike leasing for a personal use only is not excluded.

The warranty starts with the date of purchase (receipt of the tricycle dealer) of a new bicycle. The warranty is processed via the tricycle dealer who ordered the bicycle from us.

In case of damage the dealer has to send the damaged, cleaned frame to us so that we can check it, if asked to do so by us.

In case of warranty we will replace or repair the damaged part with a part of our choice or a new part equal to the old one (warranty obligation). We do not cover any transport, labour or any secondary costs.

In the event of any action that falls under warranty the original warranty period will not be prolonged and no new warranty will be given. If HP VELOTECHNIK refuses to count a repair as warranty case we will only carry out a repair with costs after having talked to the customer or his representative, the respective dealer.

It is necessary for the purchaser to fill in the enclosed warranty registration form to benefit from the extended warranty. This filled in form has to be sent to HP VELOTECHNIK within 4 weeks after the purchase.

The warranty is only valid when the warranty pass at the end of this manual has been filled in when you received your tricycle and when every inspection listed has been done and recorded by your bicycle mechanic within the described time schedule.

In the event of any warranty the warranty pass together with a copy of the proof of purchase has to be sent to HP VELOTECHNIK through your dealer.

This warranty does not have any influence on the rights of the purchaser according to his statutory rights.

Warranty pass

Your personal warranty pass

With the HP VELOTECHNIK Warranty Pass you can assure the safety and proper function of your tricycle for many years.

Like any other vehicle your tricycle has to be checked for safe operation before riding. Your bicycle has to be maintained at regular intervals, at least once a year you will have to take your tricycle to a qualified bicycle mechanic for a thorough check.

The service plan on page 107 shows you our mandatory maintenance and service works.

If you wish you can set an upper price limit for the service with your bicycle mechanic. If the necessary works exceed this limit you will be informed in advance.

Our advice:

You can avoid seasonal waiting periods in spring and summer when you have your annual inspection done in the quiet months from October to January. Many bike shops then have special winter check offers. At any rate do make an appointment. Clean your bicycle prior to the inspection since then many of the checks by sight can be done quickly and at low cost.

Please have your specialist dealer record every inspection and service work in the Warranty Pass. This is a requirement for the validity of our extended warranty that exceeds the legal warranty.

Name:

_____

Address:

_____

_____

_____

Phone:

_____

Frame no. (see page 14 for further information)**:**

_____

I have received the bicycle in good condition, adjusted to my size and performed a test ride. I have been informed about the correct use of the recumbent, the components like derailleur and especially steering and brakes as well as the necessity of regular service and maintenance. I will read the manuals prior to the first ride and have all future users read them too. I am aware that I need to send the warranty registration form to HP VELOTECHNIK within four weeks of the purchase to qualify for the extended warranty.

Date:

_____

Customer's signature:

_____

Dealers stamp and signature:

_____

Warranty pass

Service at delivery

At the delivery of a new tricycle:

Model: _____

Order No.: _____

Date: _____

Dealer's stamp and signature:

_____

Exchanged or additionally mounted parts:

_____

_____

_____

_____

_____

(When you assemble a frame kit please list the components on an extra sheet and attach it to this Warranty Pass.)

1st service

No later than 300 kilometres or 2 months after the purchase.

Order No.: _____

Mileage approx. km: _____

Date: _____

Dealer's stamp and signature:

_____

Exchanged, repaired or additionally mounted parts:

_____

_____

_____

_____

_____

_____

Warranty pass

2nd service

No later than 3000 kilometres or one year after the purchase.

Order No.: _____

Mileage approx. km: _____

Date: _____

Dealer's stamp and signature:

_____

Exchanged, repaired or additionally mounted parts:

_____

_____

_____

_____

_____

_____

3rd service

No later than 6000 kilometres or two years after the purchase.

Order No.: _____

Mileage approx. km: _____

Date: _____

Dealer's stamp and signature:

_____

Exchanged, repaired or additionally mounted parts:

_____

_____

_____

_____

_____

_____

Warranty pass

4th service

No later than 9000 kilometres or three years after the purchase.

Order No.: _____

Mileage approx. km: _____

Date: _____

Dealer's stamp and signature:

_____

Exchanged, repaired or additionally mounted parts:

_____

_____

_____

_____

_____

_____

5th service

No later than 12000 kilometres or four years after the purchase.

Order No.: _____

Mileage approx. km: _____

Date: _____

Dealer's stamp and signature:

_____

Exchanged, repaired or additionally mounted parts:

_____

_____

_____

_____

_____

_____

Warranty pass

6th service

No later than 15000 kilometres or five years after the purchase.

Order No.: _____

Mileage approx. km: _____

Date: _____

Dealer's stamp and signature:

_____

Exchanged, repaired or additionally mounted parts:

_____

_____

_____

_____

_____

_____

7th service

No later than 18000 kilometres or six years after the purchase.

Order No.: _____

Mileage approx. km: _____

Date: _____

Dealer's stamp and signature:

_____

Exchanged, repaired or additionally mounted parts:

_____

_____

_____

_____

_____

_____

Warranty pass

8th service

No later than 21000 kilometres or seven years after the purchase.

Order No.: _____

Mileage approx. km: _____

Date: _____

Dealer's stamp and signature:

_____

Exchanged, repaired or additionally mounted parts:

_____

_____

_____

_____

_____

_____

9th service

No later than 24000 kilometres or eight years after the purchase.

Order No.: _____

Mileage approx. km: _____

Date: _____

Dealer's stamp and signature:

_____

Exchanged, repaired or additionally mounted parts:

_____

_____

_____

_____

_____

_____

Warranty pass

10th service

No later than 27000 kilometres or nine years after the purchase.

Order No.: _____

Mileage approx. km: _____

Date: _____

Dealer's stamp and signature:

_____

Exchanged, repaired or additionally mounted parts:

_____

_____

_____

_____

_____

_____

11th service

No later than 30000 kilometres or ten years after the purchase.

Order No.: _____

Mileage approx. km: _____

Date: _____

Dealer's stamp and signature:

_____

Exchanged, repaired or additionally mounted parts:

_____

_____

_____

_____

_____

_____

Warranty pass

12th service

No later than 33000 kilometres or eleven years after the purchase.

Order No.: _____

Mileage approx. km: _____

Date: _____

Dealer's stamp and signature:

_____

Exchanged, repaired or additionally mounted parts:

_____

_____

_____

_____

_____

_____

13th service

No later than 36000 kilometres or twelve years after the purchase.

Order No.: _____

Mileage approx. km: _____

Date: _____

Dealer's stamp and signature:

_____

Exchanged, repaired or additionally mounted parts:

_____

_____

_____

_____

_____

_____

Warranty pass

14th service

No later than 39000 kilometres or thirteen years after the purchase.

Order No.: _____

Mileage approx. km: _____

Date: _____

Dealer's stamp and signature:

_____

Exchanged, repaired or additionally mounted parts:

_____

_____

_____

_____

_____

_____

15th service

No later than 42000 kilometres or fourteen years after the purchase.

Order No.: _____

Mileage approx. km: _____

Date: _____

Dealer's stamp and signature:

_____

Exchanged, repaired or additionally mounted parts:

_____

_____

_____

_____

_____

_____

Service plan

The service plan on the next pages is intended to give you a rough overview over the required maintenance and service works. In no case it can replace the detailed instructions in this manual!

You can perform service works marked with a "•" if you have the required skills and tools as for example a torque wrench.

If you discover any defects while checking your bicycle they have to be repaired immediately. If you are in doubt, please consult your local bike shop.

Works marked with a "◆" should only be carried out by a trained bicycle mechanic.

At the annual service the bicycle mechanic has to carry out all works listed as well as all services and maintenance works necessary according to the momentary technical standard and professional knowledge.

Please follow at any rate the manuals of the parts manufacturers.

The service intervals given in this Warranty Pass refer to an average use and a riding performance of 3.000 km per year.

When you ride more kilometres per year or often ride under bad conditions like rain, grit or dirt it is necessary to have shorter maintenance intervals.

In order to measure your riding performance, we recommend to use a bicycle computer.

The regular service maintains the safe operation and the value of your bicycle. Not only does the completed Warranty Pass record the maintenance works for the validation of your warranty but also does it prove the care and the value of your bicycle – a good thing to have when you are going to sell your tricycle one day.

part	work
lighting system	check function adjust headlamp and rear light, check cable contacts clean reflectors, replace missing reflectors
tires	check air pressure check tread and sidewalls
brakes	check for damages check for leaking oil check rigid feel brake lever blades when pads reach rotor check brake pads for wear
suspension element	clean and oil thread, push rod, air chamber lubricate bushes replace worn out parts / hydraulic cartridge
suspension struts front axle (not for Scorpion, Scorpion fx, Gekko fx 20 and Gekko fx 26)	check shock boot and clean stanchion tube disassemble, lubricate check for play replace worn out parts rubber strut bearings: visual check for damage replacing the rubber strut bearing
rear swingarm	check function and bearing play, tighten axle screws
bottom bracket bearings	check bearing play
rims	check wall thickness, wear, condition
chain	grease and check for wear
chaintubes	check for wear expand ends or exchange tubes
chain roller	check for wear, check bearing
crank	check, tighten
paintwork	conserve and repair
wheels	check alignment and spoke tension
handlebar	check for damage / bends check track rod for proper mounting
headset	check adjustment (only models without front suspension)
hubs	check bearing play and brake discs mounting
pedal	check bearing play, check binding mechanism
frame	check clamping of the front boom clean and conserve check for damage, damage to paintwork
quick release	check correct closing
derailleur	check for movement and function clean and lubricate
screws and nuts	check and tighten
mudguards	check for damage and correct position
valves	check for correct position and air tightness
stem	check clamping check clamping screws
cables	dismount, lubricate, replace if necessary

Service plan

see page	before every ride	monthly	annually	Note
49	●			
	●		●	
63	●			
		●		
52	●			
	●			
	●			
		●		
74		●		
			●	
			◆	
80		●		
		●		every 6 months
			●	
			◆	
			◆	
			◆	every 3-5 years
88			◆	
			◆	
			◆	
57		●		
59		●		
			◆	
61		●		
			◆	
		●		
62		●		
37			◆	
	●			
66			◆	
			◆	
			◆	
32, 92	●			
		●		
		●		
12	●			
56	●			
		●		
11, 95		●		
90		●		
62	●			
37	●			
			◆	recommended interval to replace aluminium stem: 2 years
54, 57			◆	

INFO
recumbent
technology















HP VELOTECHNIK

HP VELOTECHNIK GmbH & Co. KG ● Kapellenstraße 49 ● 65830 Kriftel ● Germany
phone +49 61 92 - 97 99 2 - 0 ● fax +49 61 92 61 92 - 97 99 2 - 299 ● mail@hpvelotechnik.com ● www.hpvelotechnik.com