

INFO
recumbent
technology

... recline in style!



HP
VELOTECHNIK

Operating manual and service instructions for HP VELOTECHNIK recumbent bicycles

version: February 2023



Serial numbers of your recumbent and its parts:

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Introduction

Dear customer,

Thank you for buying a recumbent bicycle designed by HP VELOTECHNIK and congratulations on the purchase of your new recumbent bicycle! With this high-quality touring bicycle, 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 bicycle 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 bicycle 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.

This guide helps you to keep your bicycle 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

Version February 2023.

For latest product information and manuals visit www.hpvelotechnik.com

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Grasshopper fx

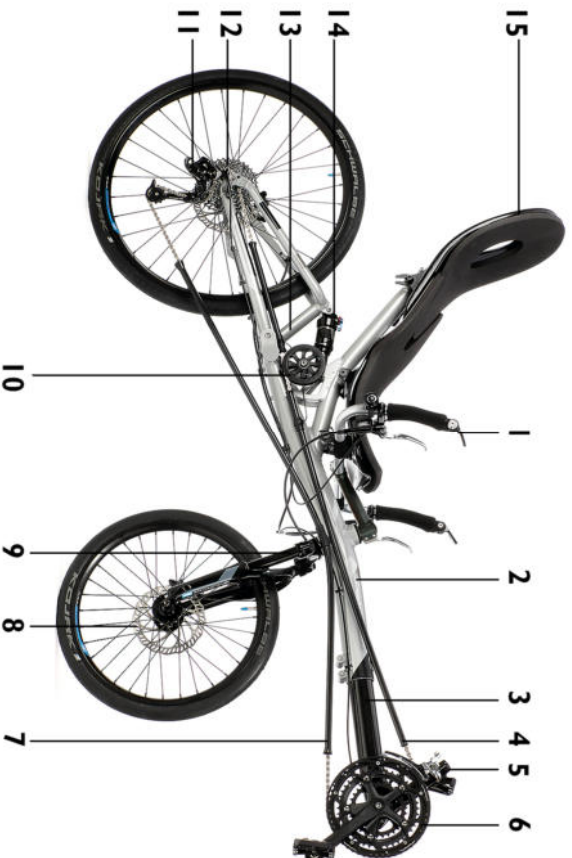


Streetmachine Gte



Speedmachine





- | | | | | | |
|---|---|---|------------------|----|-------------|
| 1 | Underseat steering handlebar with barend shifters | 6 | Chainrings | 11 | Derrailleur |
| 2 | Main frame | 7 | Lower chain tube | 12 | Cassette |
| 3 | Front boom | 8 | Brake disc | 13 | Swingarm |
| 4 | | 9 | Fork | | |

The illustration shows the most important elements of a recumbent bike, here with a Streetmachine.

Different models can be equipped differently. Your bike may not be identical to the one shown.

Content

Safety instructions	8	Adjusting the front boom to your leg length	29
General safety instructions	8	Adjusting the front boom with quick adjust	32
Intended use	9	A good setting for the handlebars	33
Load capacity	9	Adjusting the handlebars	33
Carrying luggage	9	Adjusting the handlebar angle	33
Final assembly	10	Above seat Tiller handlebar steering	34
Bolts and nuts	10	Above seat Aerobar steering	35
Quick release levers	11	Underseat steering (direct steering)	38
The first miles	11	Underseat steering (indirect steering)	38
Legal requirements	13	Adjusting the cable length	39
Safety instructions (bicycle)	13	Handling instructions	41
No alteration of parts	13	Folding of Grasshopper fx	41
Frame number and identification marks	13	Maintenance work on the folding joint	41
Added parts and accessories	14	Folding	41
Fairings	14	Unfolding	42
Replacement of parts	14	Lighting	44
Taking children with you	15	Lighting systems	44
Trailers	15	Brakes	45
Electric assist systems	15	Handling of the brakes	45
Safety instructions S-Pedelec	17	Maintenance of the brakes	46
Use in road traffic	17	Cable operated (mechanical) brakes	46
Exchanging parts	17	Hydraulic brakes	47
Added parts and accessories	18	Gear system and chain	48
Do not take kids with you	18	Handling of the gear system	48
Trailers	18	Adjusting the gear system	48
No alteration of parts	18	Chain	49
Factory plate and tire pressure label	18	Chain tubes	51
Electric auxiliary drive	18	Replacing the chain tubes	52
Riding a recumbent bicycle	19	Chain roller	53
Before the first ride	19	Wheels	54
Before every ride	20	Unmounting and mounting the wheels	54
How to ride correctly and safely	20	Tires and tubes	54
Protective clothing, clipless pedals and strain	20	Repairing a flat tire	55
		Spokes	55
		Adjusting the headset (Streetmachine Gte and Grasshopper fx)	56
Adjusting your recumbent bicycle	22	Headset and Pedals	56
Adjusting the seat	22	Adjusting the headset (Speedmachine)	57
Seats	22	Pedal mounting	57
The BodyLink seat	22	Suspension	58
Seat cushion	24	Suspension and damping	58
ErgoMesh and ErgoMesh Premium seat	25	Suspension fork on Grasshopper fx and Streetmachine Gte	60
ErgoMesh Premium Seat	25	Concept spring fork on Speedmachine	61
ErgoMesh seat: adjusting the seat frame	27	Steel spring rear shock DV-22	65
Adjusting the seat cover	27	Air shock ROCKSHOX Monarch	68
OrthoFlex® pads	27	Swingarm pivot	71
All models: taking off the seat	27	Swingarm pivot	71
Care instructions	28	Kickstand, Mudguards, Water bottle cage	72
The headrest	28		
Rain cover	28		
Adjusting the front boom	29		

Kickstand	72
Mudguards	72
Water bottle cages	72
Maintenance routine	73
Regular maintenance	73
Wear and tear	73
Carbon parts	73
Cleaning and conservation	73
Storing the bicycle	74
Transport in the car	75
Disposal	75
Tightening torques	76
Warranty policy	77
Warranty pass	78
Service plan	87

General safety instructions

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

In case your bicycle is equipped with a pedelec motor assistance system please read the manuals of the system manufacturer. Additionally, read the chapter "Before every ride" on page 19.

This manual presumes your ability to ride a bicycle. It is no instruction to learn how to ride a bicycle. Mounting and repairing the bicycle is also no content of this manual.

Always be aware that riding a bike in principle may be dangerous. As a cyclist you are endangered in a notable manner. Bear in mind that you are not as protected as e.g. in a car. There is no body and no airbags. However you are faster than a pedestrian. That's why pay special attention to other traffic participants.

Never ride with earphones. Don't phone while cycling. Never use a bicycle when you are not able to fully control your ride, especially in association with medications, alcohol, and drugs.

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.

Instructions in this manual apply to fully assembled HP VELOTECHNIK bicycles (Grasshopper fx, Streetmachine Gte or Speedmachine)

with standard parts from HP VELOTECHNIK series production only.

On special demand HP VELOTECHNIK delivers frame kits to put a specialist dealer in a position to assemble a bicycle 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 bicycle 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. Please read them carefully. The signs explained below will be used in this document without being explained again!



Danger! Texts starting with "Danger!" describe an immediate danger for your life and health. Please read them carefully!



Attention! Texts starting with "Attention!" are important for your safety.

General safety instructions

Intended use

Your HP VELOTECHNIK bicycle is made for use on streets and on paved roads.

This bicycle 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.

Using your bike on public roads is only allowed if it is equipped with all accessories that are required by the applicable traffic regulations in the country you are riding in.

Never ride freehand! Before your first ride, read the chapter "Riding a recumbent bicycle" on page 19 and get used to the different vehicle behaviour.

Damage by inappropriate use, assembly errors, accidents or similar activities, also wilful damage, will result in the loss of any warranty.

The intended use also includes the precise observation of the prescribed usage and maintenance regulations and instructions.

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, "Adjusting the damping and suspension" on page 58.

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).

Maximum total weight also includes the weight of a trailer when used.

Weights for base configuration with pedals:

<u>Model</u>	<u>Weight</u>
Grasshopper fx:	from 15,2 kg
Speedmachine:	from 13,5 kg
Streetmachine GTe:	from 14,6 kg

Carrying luggage

Luggage transport is only allowed with the special rear rack or lowrider rack supplied by HP VELOTECHNIK

If a license plate holder is mounted, it must not be loaded with luggage.



Rear rack and lowrider mounted on Streetmachine GTe

Allowed maximum loads:

- on the rear rack: 25 kg (55 lbs).
- on the lowrider rack: 25 kg (55 lbs)

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.

General safety instructions



Danger! Additional load can influence the handling of your bicycle 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 leads to a more stable performance. You can also improve the handling of the bike by positioning the centre of gravity of the luggage as low as possible, so pack heavy items in the bottom of your panniers. Hang heavy panniers on the lowrider rack preferably to the rear rack.

Be careful that your luggage on the racks is safely stored. Bags must be tightly fastened to the rack so they can not move. In no case, loose parts like straps or belts may touch the wheels, the derailleur or the suspension.

The rear rack is designed for standard bike panniers. The lowrider rack under the seat can be used with special lowrider (front wheel-) bags.

Take care that your luggage does not cover the lighting system and the reflectors of your bicycle and that they stay fully functional.

In case you want to park your bicycle take care to lean it on a wall or any other solid object. With the kickstand alone it is not possible to safely park a bicycle loaded with luggage, it may fall over and be damaged.

Final assembly

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

Your dealer carefully finished the assembly, perhaps altered the specification of your bicycle 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 76.

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



Attention! 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 and screws regularly if they are tightened appropriately with a torque wrench.

In the table on page 76 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 76 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 always have 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.

General safety instructions

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, gray-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 lever should increase considerably, corresponding in the end to 15 – 20 kg

(46 lbs). In its final position, the lever should come parallel with the bicycle 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.

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 bicycle. It is also possible to exchange the quick releases with special security screws (e. g. from PIT-LOCK) that can only be opened with a special tool. For this please consult your local specialist dealer.



Attention! All quick releases must be locked tightly before you start riding.

When closed the quick release lever must be close to the frame or fork.

When closed the quick release lever's tip must face rearwards. This avoids unwanted opening through contact with obstacles.



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

The first miles

The first 300 km (186 miles) are important for breaking in the bicycle. During the first use of a new bicycle the screws may settle and become loose. Cables and spokes may stretch.

General safety instructions

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 bicycle to a bicycle mechanic for the first service. Please record this first service and the work performed in the warranty pass on page 78. This first service is the prerequisite for further use of the bicycle and for your warranty claims.

Safety instructions (bicycle)



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.

Legal requirements

When you ride your bicycle on public roads it must comply with national legislation and guidelines in your 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 bicycle 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 bicycle 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.

No alteration of parts



Attention! You are not allowed to perform any change to the parts of the bicycle, 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 located on the outside of the left gusset plate.



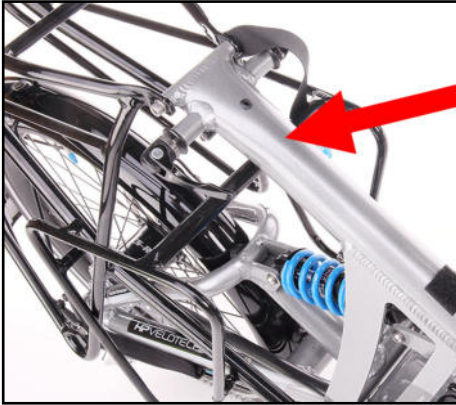
Position of the HP VELOTECHNIK frame number

If you want to apply an additional identification mark, we recommend adhesive coding.

You can also additionally code your recumbent by means of an engraving. An engraving can be applied in two areas:

- in the area of the gusset plates analogous to the frame number
- on the upper side of the seat tube below the cable guidance.

Safety instructions (bicycle)



Position for an identification mark

Added parts and accessories

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

Take care that the handlebar and the suspension 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 bicycle 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.



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.

Fairings

As a front fairing for recumbent bicycle Grasshopper fx or Streetmachine, you may use the

Streamer fairing offered by HP VELOTECHNIK (not available for Speedmachine). 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 bicycle 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.



Streetmachine Gte with "Streamer" front fairing

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!



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!

Safety instructions (bicycle)

Taking children with you

HP VELOTECHNIK bicycles 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.

Trailers

You are allowed to use trailers up to 40 kg (88 lbs). We recommend you to assemble it with the WEBER-coupling Type E. Always check that the suspension and the trailer still work properly after having mounted the trailer. Take care that the trailer does not damage the frame in case the bicycle falls over.

For Chariot trailers you can order a coupling adapter for 20" rear wheels.

Read the manual of the trailer manufacturer carefully and check for speed regulations, maximum load capacity as well as regulations for trailers on public streets in your 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.

Electric assist systems

HP VELOTECHNIK offers electric assistance system for your recumbent bicycle.

Please follow the instructions in the manuals of the electric assistance system manufacturer.



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 charger and battery from heat, e.g. from strong sunlight or radiators.

Pay attention when charging:

1. Only use intact charger and rechargeable 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.

Safety instructions (bicycle)

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.

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.

Safety instructions S-Pedelec



Attention! The situation described below is valid for Germany only. Inform yourself about the regulations in your country.

Use in road traffic

According to German law, the Speedmachine S-Pedelec is not a bicycle but a motor vehicle class L1e-B. In the US the Speedmachine S-Pedelec is a Class 3 electric bike. With additional power from the rider's muscles, up to 45 km/h (28 mph) can be reached. At that speed, the motor assistance is switched off completely.

To be allowed to use the S-Pedelec on public roads, it must be equipped with an insurance plate.

An insurance license plate is obtained when taking out liability insurance for the Speedmachine S-Pedelec. The rider always has to carry the insurance card while riding.

The rider must wear a proper helmet while riding the S-Pedelec.

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. Driving an S-pedelec without an operating license is an administrative offense in Germany.



Danger! If any part is deformed (e. g. due to an accident or overload), especially frame, 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!

All components that are not listed below may only be replaced with original components.

Some parts are only allowed to be exchanged by parts identical in construction. Such are:

- frame parts
- chassis parts
- wheels including rim tape
- drive unit:
 - motor, accumulator, console
- brakes
- lighting system
- handlebars, stem
- console for insurance plate and rear light

Some components on motor vehicles are subject to approval. 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 or the operating license.

- tires (also see chapter „Factory plate and tire pressure label“ page 18)
- rear mirror (with the same mounting position)
- pedals
- reflectors

The following parts may be exchanged by parts recommended for the Speedmachine S-Pedelec by HP VELOTECHNIK:

- Suspension fork spring, spring element, damper
- brake pads

Safety instructions S-Pedelec

- seat (possible seats: ErgoMesh, Er-goMesh XL, ErgoMesh Premium, Body-Link, BodyLink with adaptor for small persons).
- fenders

Parts with no exchange restrictions are the following:

- Drive: gearing system, chain rings, sprockets
- cranks
- grips
- tubes
- chain (in original width)
- bottom bracket

Added parts and accessories

Additional accessories may invalidate the operating licence or impair the function of your S-Pedelec. This may also apply to accessories that are not listed in the chapter „exchanging parts“. Before mounting parts and accessories, it is recommended to contact your bicycle dealer.

Additional battery/rechargeable headlights are not permitted.

Bicycle bags are permitted. The permissible total weight must not be exceeded.

Do not take kids with you

The transport of children with the Speedmachine S-Pedelec is not allowed.

You are not allowed to mount a child's seat

Trailers

Towing a trailer is not allowed.

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.

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 between the seat and the battery. The factory plate must not be removed under any circumstances!

The tire pressure label is also located on the left side of the frame between the seat and the battery. It contains the following information:

- tire size (e.g. 47 -406)
- speed index (e.g. 10 B)
- rim width (e.g. 17C -27C)
- recommended tire pressure at full load in kPa and bar

Additional identification number

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

Electric auxiliary drive

Operating and safety instructions for the electric drive can be found in the operating instructions for the drive system.

No riding without accumulator

According to the regulations in your country, it might not be allowed to ride the Speedmachine 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 bicycle

Before the first ride

Before you mount your bike and enjoy your first ride please make yourself familiar with the instructions on the riding technique and the handling

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

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

Get your bicycle adjusted with the help of your specialist dealer like described in "Adjusting your recumbent bicycle" on page 22.

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 bicycle 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 bicycle in traffic you must master the handling completely.

Go to a road where you can ride straight ahead without being hindered. Hold your bike at the handlebars and pull a break. Then mount your bicycle and lean back. Leave one foot on the ground and put one on the pedal. Therefore rotate the crank in the top position so that you can pedal immediately with power.

Try to keep your balance in that position. Assure yourself that you can stop whenever you want to and hold the bicycle with one foot on the ground. When you feel safe put pressure on the pedal, loosen the brake, pedal with a

lot of force and immediately put your second foot on the other pedal.

Do not care on which side of pedal you are currently pedalling in the beginning. Hold the handlebar loose but steady and accelerate with a few pedal strokes. Your bicycle needs speed to stabilise.

Look ahead in the direction where you want to ride, not on the handlebar, at your feet, or the front wheel.

In order to stop brake carefully with both brakes until the bicycle has come to a complete stop. Only then do put a foot on the ground and keep the balance.




Danger! Never touch the ground with your feet while the bicycle is still moving. The feet could be caught on the ground and be pulled backwards which could lead to a serious injury. See also information about clipless pedals on page 20 Protective clothing, clipless pedals and strain.



Danger! With a compact recumbent like this it is possible that a foot of the rider contacts the front wheel when riding sharp corners with a pedal in a low position. You will have to avoid this situation at all times since in extreme situations it may lead to a fall and injuries.

To control the bicycle you will have to apply the following cornering technique: when you ride a curve, stretch the leg on the inside of the curve, stop pedalling, only then start steering into the curve. Only when you ride straight ahead again should you resume pedalling. Small riders should shorten the front mudguard to get more clearance.

Riding a recumbent bicycle

 **Danger!** Please note 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 you to mount a well visible and reflecting flag to the bicycle while using it in traffic. Please ask your dealer for more information. Find information about lighting systems from HP VELOTECHNIK on page 44.


Before every ride

Check before every ride:

- bell and 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.


How to ride correctly and safely

Always carry your bicycle 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.

 **Danger!** 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 bicycle immediately for deformations and cracks. If you are in doubt please consult your local dealer.

Do not ride freehand

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.

 **Danger!** 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 a Pedelec, be aware of the higher speed level this vehicle provides. Ride defensively. Only ride at higher speeds where and when this is safe!

Protective clothing, clipless pedals and strain

Wear protective clothing

Riding a bicycle 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

Riding a recumbent bicycle

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 bicycle can be upgraded on demand with a binding system. As soon as you are comfortable with riding your bicycle 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 therefor 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 the seat

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.

The seating position is essential for riding comfort, your well-being and efficient power development on the recumbent. Therefore, adjust the frame, the seat, the handlebar and the suspension exactly to your needs.

If your recumbent is equipped with the optional quick-release frame adjustment, please follow the operating instructions for the quick-release frame adjustment in addition to the instructions below.

The fine adjustment of the recumbent to your individual body and finding the most suitable seating position is done by adjusting the front boom, the seat and the handlebars.

Seats

For your recumbent HP VELOTECHNIK offers shell seats (BodyLink) and mesh seats (ErgoMesh): In the following you will find information about the adjustment possibilities of the different seats. The seats can be removed from the recumbent without tools.

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 shouldn't 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.



Adjustability of the BodyLink seat (here: Streetmachine Gte with tillerbar)

Adjusting the seat length

Take off the seat cover (see page 24). 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. Step behind your bicycle 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.

Adjusting the seat



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 bicycle 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 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.

Because of the flexibility of the BodyLink seat and the special shape of the seat mountings,

the seat effectively pivots around a central axis, approximately in the area of the lower lumbar vertebrae. This is the place where you support most of your pedalling force while riding, so this point determines the distance to the pedals. The advantage of this design is that you adjust the distance from the seat to the bottom bracket only once as described above; a change in the seat angle does not require an adjustment of the front boom.

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.

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.

Adjusting the seat

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 bicycle.

Please pay attention to the instructions about quick release levers on page 11.

Seat cushion

EVA foam 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.

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 good glue.



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.



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.

Airflow 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. You can wash the Airflow Cushion at 30° centigrade and it dries very quickly.

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.



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.

Adjusting the seat

ErgoMesh and ErgoMesh Premium seat



ErgoMesh seat on the Grasshopper

Description

HP VELOTECHNIK offers ErgoMesh and ErgoMesh Premium seats. ErgoMesh Premium seats are equipped with a Seat-O-Flex joint. This allows the angle of the back section and the seat section to be adjusted independently of each other.

ErgoMesh seats don't have a Seat-O-Flex joint.



ErgoMesh seats have a rigid frame. ErgoMesh Premium seats (in the picture) are equipped with Seat-O-Flex-joints

All variants of the ErgoMesh seat and the ErgoMesh Premium seat include OrthoFlex®-Pads.

ErgoMesh and ErgoMesh Premium seats are available in standard and XL versions (see also page 25, "ErgoMesh Premium Seat"). XL seats have a 3 cm longer seat back and are 5 cm wider than the standard version.

Please note that depending on the model, the XL version is not compatible with the lower handlebar variants or requires a wider lower handlebar, see page 33 "Adjusting the handlebar").

ErgoMesh Premium Seat

Speedmachine: can be ridden with an ErgoMesh Premium seat.

Grasshopper fx: newer frames can be ridden with an ErgoMesh Premium seat, recognizable by the frame number. The frame number includes a date: HPI220GHFXXXX (12 - month, 20 - year). Frames from 1220 and newer can be ridden with an ErgoMesh Premium seat, older frames cannot.

Streetmachine Gte: 2 additional seatend stops must be mounted. The seat stops are not included in the scope of delivery of an ErgoMesh Premium seat and must be ordered separately.

Mounting of the end stops on a Ergo Mesh Premium seat for a Streetmachine Gte

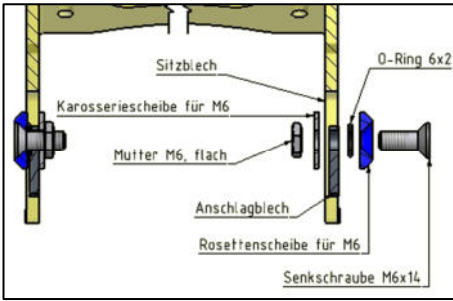


Danger! If a Streetmachine Gte with ErgoMesh Premium seat is ridden without end stops, the steering may be blocked.

This can lead to accidents with injuries or even death.

Make sure that end stops are always mounted in the front seat connections of the ErgoMesh Premium seat of your Streetmachine Gte.

Adjusting the seat



Mounting order of the end stop sheets

- The end stops are mounted in the slot of the front seat connection (see fig. "ErgoMesh Premium seat folded", page 26: 3).
- Open the bolt of the end stops so far that you can easily insert the end stop sheets into the slots of the seat connections. The blue countersunk washers point outward.
- Mount the end stops as far as possible in the slot of the seat connection and tighten them with 7–9 Nm.
- The end stops must not be disassembled.



End stops mounted on a ErgoMesh Premium seat to ensure handlebar free movement on a Streetmachine Gte

ErgoMesh Premium: Mounting and Adjusting the seat frame



ErgoMesh Premium seat folded:

- 1 - seat connection sheet of the backrest
- 2 - middle seat connection sheet
- 3 - front seat connection sheet

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 53.

Adjusting the seat

ErgoMesh seat: adjusting the seat frame

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.

Adjusting the seat cover

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 (lumbar support).

Tension belts on the back side of the seat allow the adjustment of the seat net 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.

OrthoFlex® pads



Insert the OrthoFlex® pads

Four OrthoFlex® pads are included with your mesh seat. These can be inserted into the pockets marked "OrthoFlex" on the seat as required. The long cushions belong to the backrest, the short ones to the seat surface.

Slide the OrthoFlex® pads into the corresponding pockets.

Close the pockets with the Velcro fasteners.

Take a seat on the securely mounted seat and check the position of the OrthoFlex® pads. You can make small corrections while seated.



Attention! An uncontrolled rolling recumbent or a recumbent that is not parked securely can lead to accidents. Only make adjustments to the seat pads and the tensioning straps on a safely parked recumbent bike.

All models: taking off the seat

Both ErgoMesh (Premium) 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.

Adjusting the seat

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.

First pull the seat out of the lower and middle receptacle and then at the upper receptacle.



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.

Care instructions

The seat cover including the straps is washable by hand and gentle detergent. Do not wash the seat cover in the washing machine. Dry it in the air. Do not dry it in a dryer.

The headrest

Both seat types can be equipped with a head / neck rest, which is adjustable in height and angle, to relax the muscles in your neck on long rides.

Its height and inclination is adjustable at the clamp. When wearing a helmet the headrest pad should be positioned under the lower helmet edge next to your neck. Adjust the inclination in a way that the headrest does just not touch your neck/head while riding. It may be necessary to cut the two tubes protruding the clamp on the underside to prevent them from touching your back.

Use the long holes and the screw hidden under the cushion (BodyLink seat) or the mounting clamp (ErgoMesh seat) for setting up the correct position. (There is also a mounting clamp with quick release levers available for the ErgoMesh seat.) It may be necessary to cut the two tubes protruding the clamp on the underside on ErgoMesh-head rest to prevent them from touching your back.



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

Rain cover

To keep the seat dry when your bicycle is parked you can additionally purchase a rain cover. It can be carried in the optional Micro-bag or in the bag the ErgoMesh seat is equipped standard with.



Attention! Don't sit down on the rain cover. It may get damaged.

Adjusting the front boom

Adjusting the front boom to your leg length

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 clamping to adjust the length of 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 pulling out the front boom, shift the chain to the smallest chainring 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.



Adjust the front boom in a way that your knee will not be fully straightened when pedalling.



Attention! When you move the front boom take care that its end does not damage any light cables that possibly come out of the main frame. Please inform yourself about the length of the front boom on your bicycle 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 bicycle that there is enough heel clearance. For shorter riders under 175 cm body height we recommend to use shorter cranks.

Adjusting the front boom

Attention! When you insert the front boom, the front boom and the inner wall of the tube must be totally free from grease, otherwise it won't clamp properly and turn while you are riding.

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 bicycle and check the position.



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

Tighten the bolts with a torque wrench (tightening torque 11–12 Nm). On your first ride check whether there is sufficient clamping.

Attention! The minimum insertion depth of the front boom into the main frame is 8 cm (3 1/5"). 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 plastic bushing between front boom and main frame must be visible at all time



If there is no bushing or the bolts were tightened too fast, the front boom clamping might be damaged

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 into the frame. This bushing ensures safe clamping of the front boom and protects the paint. It is important to take care that this bushing 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 bushing 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 bushing will lead to frame damage.

Adjusting the front boom

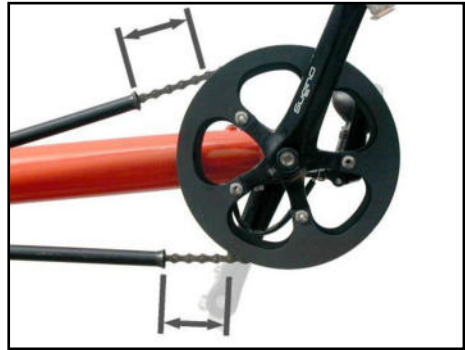
Danger! If the bolts are tightened too much or bent, the screw or the frame can break! If the clamping is insufficient the front boom can turn during a ride which may cause your feet to slip from the pedals and lead to injuries.

After moving the bottom bracket tube your dealer has to adjust the chain length. By default the bicycle comes with a very long chain so the adjustment range of the bicycle 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 bicycle, the chain has to be shortened so that the derailleur cage is not fully turned forward while shifting on the largest chainring 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 (e.g. Rohloff-Revolver). A poorly joined chain may break and thus lead to damage or injury.

Attention! Take care that the chain 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 chain tube gets in touch with the rotating chainrings it can be locked-up and destroyed. The chain tubes must be prevented from moving by a rubber tube over the retention spring.



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

Attention! The chain tubes must be fixed to the holding spring with a rubber tube

We recommend to slightly readjust the front boom every 3 months so that knees 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

Adjusting the front boom

little pressure. Pedalling with too much pressure may also lead to pain in the knees.

Adjusting the front boom with 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.



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

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 chainring and the largest sprocket to check the correct chain length.

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.

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.

Align the bottom bracket axis horizontally when looking from the front. Close both quick release levers.

Move the chain to the smallest chainring 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.



Danger! The front boom quick release levers must be closed tightly before riding. Please pay attention to the instructions about quick release levers on page 11.

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 bicycle, make sure to avoid pulling at the handle bars or stepping on the tie rods. To get off the bicycle, 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.

For recumbent bicycles from HP VELOTECHNIK you can optionally choose various types of handlebars.

There are two versions of above seat steering available for the Speedmachine and Grasshopper fx: Tiller steering and Aerobar steering. Both feature a adjustable stem which fixes the handlebars to the fork. The Tiller steering on Streetmachine Gte and Grasshopper fx comes with the foldable Terracycle Glideflex stem. All three bicycles described in this manual can also be equipped with underseat steering. On Grasshopper fx and Speedmachine, the underseat steering is indirectly connected to the fork by a steering rod.

On the following pages, the differences and setting instructions are described. Please pay attention to the information referring to your handlebar type.

Adjusting the handlebar angle

In order to change the angle, loosen the screws of the handlebar clamping. Turn the handlebars until they are in your favourite position.

Check that the stem clamps the handlebars exactly in the middle. Tighten the clamping screws with 6–8 Nm.

Check the correct clamping of the handlebars by sitting on your bike and pulling the handlebars. Doing so, the handlebar grips must not turn.



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

Tiller steering:

Turn the handlebars so that the grips point downward or slightly forwards. Your wrists should be in a relaxed position perpendicular to your arms.

Aerobar steering:

Turn the handlebars in order to reach a relaxed position with slightly bent arms. The handlebar ends may be shortened if necessary.

Under seat steering:

Most riders are comfortable with a 45° angle so that the grip points diagonally to the front and up. The more upright the grip position,

Adjusting the handlebars

the less the maximum possible rotation angle of the handlebars, since they touch the frame, the seat, or the lowrider rack earlier.

Above seat Tiller handlebar steering

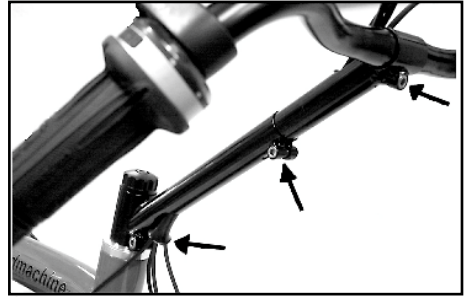
Our recumbent bicycles with Tiller steering are equipped with a height adjustable stem. On Streetmachine Gte and Grasshopper fx it comes with the Glideflex folding pivot from TERRACYCLE. Folding the handlebar forward makes it easy to get on and off the bicycle and a relaxed position for the hands while riding. Information about the Glideflex stem on page 35.



Grasshopper fx with Tiller steering

With the tiller steering, the grips of the handlebar should show to the front in riding direction, away from the rider. This results in the most comfortable position to grip the handlebar since all you have to do is "hook in" your hands to the handlebar. This position allows easy cornering as it gives the rider the most space between handlebar and belly.

The adjustable stem should preferably be set to the shortest possible position while taking care that the legs don't touch the handlebars when riding. To check this, make sure that you have correctly adjusted the leg length as described above and sit down on your bicycle.



Clamping of the fixed stem with above seat steering

Alignment of the stem to the front wheel



Danger! Aligning the stem may require adjustment of the headset bearings. In case of assembly errors the danger of accidents is increased. If you are in doubt have your bicycle mechanic adjust the stem.

Check the parallel alignment of the stem to the front wheel by folding it completely forward and looking at both stem and front wheel.

To adjust this alignment, loosen the clamping screws of the stem / fork steerer tube connection. Do not loosen the screw in the headset cap. Sit on the bike, hold the front wheel with your feet and turn the stem so that it is aligned to the front wheel.

Then tighten both clamping screws alternately with 6–8 Nm. Check the clamping by trying to turn the stem against the front wheel. Check the play of the headset bearing (See "Headset and Pedals" on page 56.)

Adjusting the handlebars

Danger! The hex-headed screw in the cap adjusts the play of the steering head bearing. This screw is not made to clamp the stem tightly to the steerer tube. It does not secure the stem against turning. Take care that both clamping screws on the side are tightened as prescribed after you have finished your works at the stem. Otherwise the stem may turn while riding and cause an accident.

Height adjustment

The stem is telescopically height adjustable. Loosen the clamping screw of the clamp of the stem extension. Move the stem extension to the desired position. Align the stem extension parallel to the front wheel, so that the handlebars are perpendicular to the front wheel. Tighten the clamping screw with 8–10 Nm.



Clamping of the height adjustment for above seat steering. The end of the upper stem half must not be visible in the clamping slot.

Danger! The stem extension must not be positioned higher than the „max“ mark on the lower stem part. In no case may the end of the lower stem half become visible in the slot of the stem extension. The clamp must be positioned tightly to the lower end of the stem extension. The clamping slot of the clamp must be aligned to the slot in the stem extension.

Glideflex stem angle adjustment

The TERRACYCLE Glideflex stem unit is equipped with a backstop adjustment screw close to the pivot axle. To adjust the backstop, fold the stem forward and turn the backstop screw in or out. Turning the bolt in (clockwise) allows the handlebars to fold further back; turning the bolt out stops the handlebars from going as far back.

Attention! Do not turn the screw so far out that it contacts the top of the stem when it is folded back. The bolt must contact the sloping surface.

Glideflex stem folding friction adjustment

To adjust the folding friction, tighten or loosen the pivot bolt. Tightening the bolt will increase friction; loosening will decrease friction. Moisture caused by rain may decrease the friction but normal function will be restored after drying.

Danger! Do not loosen the bolt past the minimum friction point. If you do, re-tighten the bolt until the friction increases. The bolt must be secured with thread-locker!

Above seat AeroBar steering

Removable stem on Grasshopper

Your foldable Grasshopper fx with AeroBar steering (around the knees) is equipped with a quick remove stem.

After folding the Grasshopper fx frame the stem may be stored on a special bracket with minimum space requirements. The bracket is situated on the right upper end of the frame's seat tube.

To take off the stem push the silver lock button on the quick release lever and open the quick release at the same time. Pull the stem upwards to release it from the fork's steerer

Adjusting the handlebars

tube. Put the stem on the bracket and close the quick release.

Assembly is done in reversed order. Make sure the alignment bolt in the clamp fits the hole in the stem clamp correctly. Put down the stem until it touches the clamp.

There must be a “click” sound when the quick release lever is closed which shows that the lever is locked.



Danger! Check if the clamping is strong enough to secure the stem against turning without the alignment bolt being inserted. Readjust the quick release if necessary. The bolt only helps to align the stem and is not intended to transmit forces.

Alignment of the stem to the front wheel (Grasshopper fx)

For parallel alignment between stem and front wheel the bolt of the lower clamp must be loosened. The quick release lever of the removable stem must be opened at the same time. Now the stem can be turned. After aligning the stem it may be necessary to adjust the headset bearing. Tighten the clamping bolt with 6–8 Nm and close the quick release.

Alignment of the stem to the front wheel (Speedmachine)

At first align the stem parallel to the front wheel. For this purpose loosen the lower clamping screw M8 with an Allen key size 6.

Get on your bike, secure the front wheel with your feet and bring the stem into line. Tighten the screw with a tightening torque of 13–14 Nm. Check the safe clamping by trying to twist the stem against the front wheel.



Danger! Aligning the stem may require adjustment of the headset bearings. In case of assembly errors the danger of accidents is increased. If you are in doubt have your bicycle mechanic adjust the stem.

Adjusting the handlebars

Adjusting the stem length

The tube with the handlebar clamp can be slid inside the stem tube telescopically to adjust the distance between your legs and the handlebar. To adjust this distance, loosen the clamping bolt and slide in or out the handlebar clamping tube. Tighten the clamping bolt with 6–8 Nm.



Danger! The minimum insertion depth of the tube is 40 mm (1 5/8 "). In no case may the rear end of the inserted tube become visible in the clamping slot



Aerobar on Speedmachine



Danger! Everytime you undo one of the clamping connections you have to check the clamping screw. The thread must not be damaged and the screw must turn easily. Once a year you have to dismount the screw completely and check it. In case of damage or deformation you have to change the clamping screw immediately. When you refit the screw it has to be lubricated carefully and tightened with the required tightening torque (see table on page 76).

In case you tighten the screws too hard, the clamping may deform and break. When you bend the screws while tightening they may break and the clamping can loosen. When you tighten the screws with an insufficient

tightening torque the clamping does not reach the necessary strength and this can result in a twisting of the handlebar or the stem while riding. All these assembly errors can lead to dangerous falls!

Adjusting the handlebars

Underseat steering (direct steering)

Your Streetmachine Gte with under seat steering has a direct steering with fixed stem.



Underseat steering on Streetmachine Gte

Alignment of the stem to the front wheel

Danger! Aligning the stem may require adjustment of the headset bearings. In case of assembly errors the danger of accidents is increased. If you are in doubt have your bicycle mechanic adjust the stem.

Check the parallel alignment of the stem to the front wheel by folding it completely forward and looking at both stem and front wheel.

To adjust this alignment, loosen the clamping screws of the stem / fork steerer tube connection. Do not loosen the screw in the headset cap. Sit on the bike, hold the front wheel with your feet and turn the stem so that it is aligned to the front wheel.

Then tighten both clamping screws alternately with 6–8 Nm. Check the clamping by trying to turn the stem against the front wheel. Check the play of the headset bearing (See "Headset and Pedals" page 56.)

Underseat steering (indirect steering)

Your Grasshopper fx or Speedmachine Gte with underseat steering is equipped with an

„indirect" steering. The handlebars are supported by a stem that pivots in the frame. The front fork is connected with a tie rod to the stem.

Horizontal alignment of the handlebars

The stem is made of two parts that telescopically slide into each other. The connection is made with a quick release lever clamping.

Open the lever while pushing the security button on the lever.

Sit on the bike and align the handlebars horizontally, so that both bar ends are at same height. Close the quick release lever until the security button locks in or tighten the clamping with 6–8 Nm

Check the safe clamping by trying to turn the handlebars in the stem. This should only be possible with high forces. If the clamping is too loose, open the quick release lever and adjust the counter nut of the quick release.

The ability to turn is designed on purpose: In case the bike falls over the handlebars can turn without being bent or broken immediately.

Danger! The minimum insertion depth of the stem half is 40 mm (1 5/8 ") on Grasshopper fx and 50 mm (2") on Speedmachine. In no case may the rear end of the inserted stem half become visible in the clamping slot.

We suggest to fully insert the stem half. If you move the handlebars further back, you will increase your turning circle as the handlebar will contact the frame or lowrider earlier.

Alignment of the stem to the front wheel with the steerer tube clamping (Grasshopper fx)

To align the handlebars perpendicular to the front wheel, turn the adaptor for indirect steering clamped into the bottom end of the fork steerer tube.

Adjusting the handlebars

Loosen the allen key bolt a few turns. Hold the front wheel and align the handlebar perpendicular to the front wheel. Push the adaptor fully into the fork steerer tube, so that the metal plate welded onto the tube is positioned directly at the end of the fork steerer tube.

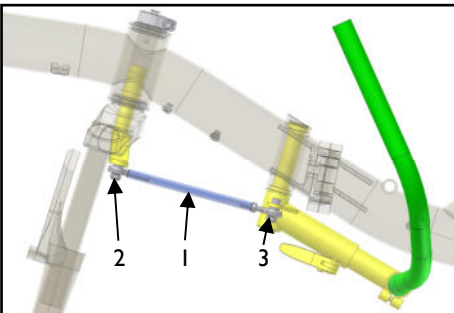
Tighten the Allen bolt with 30–32 Nm.



Danger! This tightening torque is mandatory! If you do tighten the bolt with a wrong torque, the adaptor could turn or bolt could break while riding, leading to a crash. Only use our original bolt of the strength type 12.9. The bolt head and threads must be lubricated. Do not use a washer. The clamping part and the inner steerer tube must not be greased. If you are unsure about this, let your bike mechanic carry out this work.

Alignment of the handlebars to the wheel by track rod adjustment (Speedmachine)

Remove the screw between rear connection rod end (3) and stem. Loosen the counter lock nut at the rod end. Adjust the steering rod (1) length by screwing the rod end in or out to align the handlebars perpendicular to the front wheel.



Indirect underseat steering

Adjust both rod ends parallel to each other. Make sure that the centerline of the connection rod is in a plane perpendicular to the ground, i.e. parallel to the frame.

Tighten the counter lock nut against the steering rod with 6–8 Nm.

Position the rear rod end on top of the mount at the stem and reassemble the screw and self securing nut with 6–8 Nm.

Check the correct assembly of the indirect steering by turning the handlebars in both directions until the handlebars make contact with the frame. The rod ends must move freely without hitting the frame or getting twisted.



Danger! The adaptor for the connection of front rod end and front fork must be seated firmly in the slots of the tube. Before every ride, check that there is no play in the steering system. Play will destroy your front fork and lead to unsafe riding conditions.



Danger! Before every ride, check the secure clamping of the adaptor and all steering parts. The steerer rod bolts must be secured with threadlocker and self locking nuts.

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.

Adjusting the handlebars



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 bicycle.

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

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 of Grasshopper fx

Maintenance work on the folding joint

Normally, outside the inspection interval no further maintenance work is required on the folding joint. Should damage or play occur at the folding joint, please contact your specialist dealer.

To protect against corrosion, observe the notes in the chapter "Cleaning and conservation" on page 73.

Folding

1) Bring right pedal to the front

Turn the right crank counter clockwise so that the right pedal is located in the forward position. Once folded, the pedal will thus have room next to the rear wheel.



Bring right pedal to the front and fold handlebars forward

2) Remove the seat:

Open all three quick release levers of the seat mounts. 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 lowrider rack or water bottle mount 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 mounts by hand or with a 5 mm allen key.

Pull the lower seat shell out of its mounts first, then the upper seat shell.



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



Attention! Take care that there are no parts rubbing against the frame. This may damage the paintwork. The rear end of the forward upper chain protection tube should not be further away from the chain roller than 2- 3cm (ca. 1") to prevent collision between chain and suspension fork while folded.

3a) Fold the Tiller steering

Push the handlebar stem forward, thus folding it down to the front end of the bike.



Folded Grasshopper fx with tiller steering

3b) Stow the Aerobar steering

After folding the frame, take off the Aerobar stem and mount it to the bracket provided for that, see "Removable stem on Grasshopper fx", page 35.

Folding of Grasshopper fx



Folded Grasshopper fx with Aerobar steering

3c) Stow the Under seat steering

Position yourself on the left side of the bike. Open the quick release lever of the stem under the frame while pushing the security button on the lever. Pull the handlebar clamping part out of the stem. Position the handlebars on the left side of the bike. Stow the handlebar by inserting the attached clamping part into the hole of the rubber mount at the bottom of the seat tube of the main frame.

Push the quick release axle downwards to move the security bolt that is connected to the quick release axle out of its rest position. Hold the bolt against the spring pressure in this position. Use your other hand to fold the front part of the frame to the right side.

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



Open the quick release lever, then push the quick release down to unlock the security bolt of the folding hinge



Folded Grasshopper fx with underseat steering

Grab the both chain tubes at the rubber joint with one hand and pull them up and tight to the folding hinge. Move the front frame half backwards until it rests on the rubber bumper attached to the middle seat quick release. Secure the folded bike by inserting the plastic strap into the fastener mounted under the front frame part. If you have above seat steering, secure the handlebar with the attached Velcro strap to the rear rack or rear wheel. A shoulder strap and bag for transport of the folded bike are available as an option for your Grasshopper fx.



Danger! Make sure that you do not jam your fingers when folding or unfolding the Grasshopper fx.

Unfolding

4) Fold the frame

Position yourself on the left side of the bike. Open the quick release lever on the left side of the folding hinge. Pull the quick release to the rear, sliding it out of its rest position at the front part of the folding hinge.

To unfold and reassemble your bike, please follow above steps in the opposite order. If your bike is equipped with under seat steering, please follow the instructions on page 33 for proper installation and alignment of the handlebars.

Folding of Grasshopper fx



Danger!

If the folding hinge is not fully closed or if it opens while riding, uncontrollable riding behavior with serious accident consequences may occur.

Before riding your bike, make sure the quick release of the folding hinge is securely closed:

- The security bolt must be in its proper lock position.
- The quick release lever must be closed in a horizontal position.
- Check that the lever does not obstruct the steering or the cables of your bike.

Do not start a ride if the folding hinge is defective. In this case, contact your specialist dealer to have the folding hinge repaired.

Lighting

Lighting systems

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. When using rechargeable batteries or batteries make sure that you have sufficient energy reserves.

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 lighting 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.

The lighting systems with hub dynamo are equipped with a rear light with brake light function (Braketec) from BUSCH UND MÜLLER.

Hub dynamo

You will find a switch on the back of the light with labelled switch positions. With the switch you can turn the lighting system on and off and to different sensor modes. In the sensor positions a twilight sensor in the lamp turns the lighting system on and off or changes between daytime riding light and standard light automatically depending on the brightness of the environment.



Switch on a B&M IQ-X

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! Don't try to switch the light on or off while riding. Stop and get off the bicycle! There is a serious danger to fall over or injuring your hands!

Lighting system battery

The optional lighting system for bicycles with electric assist systems is powered by the propulsion system's battery.

The lighting is switched on and off via the respective switching function of the electrical system. Please pay attention to the electric assist system manufacturer's manual.

Brakes

Handling of the brakes

Your bicycle is equipped with a powerful high-quality brake system. Please read the separate manual from the brake manufacturer that comes with your bike for details.

Make yourself familiar with the braking system. Remember which lever pulls the front brake and which the rear brake.

If the arrangement of the levers does not correspond to what you are used to, please have a bicycle mechanic change it. Please contact your local bike dealer to find out if there is any legal requirement for the arrangement of the brake levers in your country.

For optimum handling you can adjust the distance between the brake lever and the handlebar on some brake lever models. Please see the respective manual for details.

Note that the front brake is the most effective brake on the bicycle. With the front brake, you achieve a much higher braking effect than with the rear brake. The rear wheel has a tendency to lock up and slip on the pavement even under low braking forces.

The braking effect of modern brake systems can be more powerful than what you have been used to until now. Do brake carefully.

Do not brake in a bend, always brake before a bend. Braking increases the risk of slipping. Especially when it is wet the rear wheel immediately slides out of the bend while braking. This will result in a serious fall!



Danger! Please note that the braking distance is much longer when it is wet or when the bike 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 wheel slips. If it does so you will no longer be able to handle your bike, which may lead to a serious fall.

If you should hear any unusual sounds while braking, the brake pads might be worn. Do not use your bike any further until you have checked the brake pads according to the manual of the brake manufacturer or ask your local dealer.



Danger! Always make sure that the disc and brake pads are free of oil and grease. If these parts are dirty please do not use your bicycle. 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! Disc brakes can overheat on long down hill rides, fade and fail! On down hill 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.



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

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 30–40 stops from about 30 km/h (20 mph), which should be done in a safe area without traffic!

Brakes

Maintenance of the brakes



Attention! Always read the brakes manufacturer's 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 and discs suffer from wear due to friction and have to be exchanged then.

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 ok 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



Attention! 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.



Attention! 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 wheel causing the wheel to lock up.

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.

Mechanical disc brakes

To readjust the brake pads you have to use the big red knobs on each side of the brake caliper. 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.

Brakes

Hydraulic brakes



Danger! All maintenance work on the hydraulic system of your brakes may only be carried out by a qualified mechanic. 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 brakes on HP VELOTECHNIK bicycles use low viscosity mineral oil that, contrary to DOT brake fluid used in cars, does not absorb water. Thus, you don't have to change the oil. Please read the brake manufacturer's manual that comes with the bicycle.

In case of a damaged hose or any leakage of oil always consult a qualified mechanic in a bike shop.

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! 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 caliper 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 bicycle or put a piece of cardboard in the brake caliper 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 on underseat steering handlebars, water and dirt can collect inside the lever around the hydraulic cylinder. This may lead to excessive wear or leakage of the hydraulic system.



Danger! The brake lever must not be operated when your bike is lying or upside down. Otherwise air bubbles get into the hydraulic system, which can cause brake failure. After each transport, check whether the pressure point of the brake feels softer than before. Then operate the brake the brake slowly a few times. When doing this the brake system can bleed itself again. If the pressure point remains soft do not continue to drive. The qualified mechanic must bleed the brake.

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 bicycle 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 bar end 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 to a low gear to make it easy to start off again, without having to pedal heavily.

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.



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

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 chainrings and rear sprockets to shift gears. However, it is useful to ride the lowest gears (the biggest rear sprocket) with the smallest chainring, the middle gears with the middle chainring and the highest (fastest) gears with the biggest chainring.

The setup of the chainrings and sprockets leads to an overlap of some gears. This means that different combinations of chainrings 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 chainrings. 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.

Adjusting the gear system

Your dealer will adjust your derailleur gearing system carefully before handing over the bicycle. 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.

Gear system and chain

Adjusting the gear indexing for the rear derailleur

Adjust the adjuster barrel where the shift cable touches the rear derailleur. Do it 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 bicycle.

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 bicycle 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 bicycle 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 bicycle 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 chainrings.

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 chain tubes or chain idler.

Specialist stores sell biodegradable lubricants. HP VELOTECHNIK recommends a DryLubetype lubricant. 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

Gear system and chain

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 bicycle that will wear out. This shows in a stretching of the chain. Worn out chains do not fit the sprockets and chainrings any more and wear them away very quickly.

Check the chain for lengthening regularly. For this purpose, try to remove the chain from the chainring. 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 bicycle. 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 chainrings. A new chain does not fit a worn sprocket or chainring. We recommend rust resistant 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 3,8 m of 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 chainring 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.

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.

Gear system and chain

Chain 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 chain tubes, you'll have to open the chain and finally close it again. Please see the instructions on "Chain" on page 49.

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



Attention! Take care that the chain tubes 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 chain tube gets into the rotating parts of the drive train the drive train can be blocked and the chain tubes may be destroyed.



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



Attention! Check the chain tubes frequently if they are damaged or defective. Replace defective chain tubes immediately. If the chain tubes 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 chain tube 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 power 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. Now you expand the end with a proper tool, e.g. the rounded grip of a screwdriver. Quench the expanded end immediately with cold water.

Take care that the tubes don't catch fire. At any rate work in a place with sufficient ventilation. 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

Gear system and chain

cut into the correct length, complete with retention spring from your specialist dealer.

Replacing the chain tubes

In order to exchange single parts in the upper chain tubes 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 (Grasshopper fx)

Disassemble the chain roller. For this purpose hold the nut on the left side of the frame with a ring spanner size 13 and undo the screw in the chain roller with an Allen key size 8.

The screw also connects the rear suspension element with the main frame.



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 would have to replace them. Ensure that the rear swingarm comes down in a controlled and gentle fashion by putting up a solid string or cable tie between the main frame and the rear swingarm. 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 points. Otherwise, if they come up against each other uncontrolled your hands may get caught between main frame, rear arm swing and suspension element and your bicycle may be damaged.

Remember the exact position of the spacers. Take the bolt off the frame together with the

chain roller. Between frame and chain roller is a spacer that is encased in a plastic tube.

Take the retention springs off this spacer and put on the new retention springs. Turn the springs so that the retention springs run under the spacer to the tubes and the wires lie between frame and chain tube; that way the spirals look outward.

Lubricate the shaft of the retaining bolt. Push the bolt through the chain roller, the washer, the chain retention hook and the spacer with the retention spring into the frame. Secure the thread with threadlocker and tighten the nut with 17–19 Nm.

Changing the complete upper chain protection or the retention spring (Streetmachine Gte, Speedmachine)

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

Remember the exact position of the spacers. Take the bolt off the frame together with the chain roller. The end of the threaded tube in the frame is protected with a clear 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 chain tube; 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 threadlocker 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.

Changing the lower chain tube

The chain tube is connected to the mounting plate by a rubber sleeve. For dismantling the

Gear system and chain

chain tube, grab the sleeve on its rear end and pull it together with the chain tube to the rear. The rubber sleeves will release the rear tongue of the mounting plate then. Swivel the chain tube sideways. Having done that pull the chain tube to the front to release the sleeve from the front tongue of the mounting plate. Replace the chain tube 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 closes 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 by 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.

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.



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.

Dismounting and mounting of the chain roller

The chain roller of the Grasshopper fx is mounted with a special high strength screw of the German strength grade 12.9 and it may only be replaced by a screw of the same type and strength.

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

Unmounting and mounting the wheels

Wheels are fixed to the bicycle fork or rear dropouts with quick releases or nuts on the axles.

On hydraulic brakes, remove the brake caliper if possible or deflate the tire.

Pay attention to the manual of the brakes manufacturer in any case.

On rear wheels with derailleur system switch to the smallest sprocket.

On rear wheels with hub gear system, read the manufacturers manuals.

Assembling the wheels follows the described steps in reverse order. Make sure the wheels axle is in the right position of the forks or frames dropouts.

Be careful when assembling wheels with disc brakes. Do not damage the brake pads when inserting the brake disc into the caliper.



Danger! If a wheel is not secured correctly, accidents can occur. When reassembling the wheel follow the torque specifications of the hub manufacturer in the original manufacturer manual. You will find the part number on the hub.

If the wheel is fixed with a quick release, see the information about quick release levers on page 11.

Reassemble the brake cables or calipers immediately after service and check their function.

Tires and tubes

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.

When you exchange tires, please note the maximum width limit of 50 mm (approximately 2").

On the front wheel you have to use tires of ISO size 406 (20"). On the rear wheel of Grasshopper fx you have to use tires of ISO size 406 (20").

On the rear wheel of Speedmachine and Streetmachine Gte you have to use tires of ISO size 559 (26").

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

Wheels can be fastened with a quick release mounting and therefore they are susceptible

Wheels

to theft. For this reason always lock the wheels along with the frame to a solid object when you park your bicycle somewhere.

Please pay attention to the instructions about quick release levers on page 11.



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.

Repairing a flat tire

An unseated tire can rupture unexpectedly and cause serious injury or death. Be sure the tire is properly seated when inflating the tube.

To fix a flat tire start with removing wheel from tricycle. Deflate tire completely.

Then squeeze the tire beads into the center of the rim. Use a tricycle tire lever set to pry the tire bead up and out of the rim. Start left and right from the valve. Repeat around the wheel until one bead is off the rim.

Then remove tube and, if you want to change it, the tire.

Carefully inspect inside of the rim and tire for the cause of the flat.

By inflating the tube a little it will be easier to place it inside the tire.

Insert the valve stem through valve stem hole in rim and fix it with the valve nut.

Start at the valve stem when installing the first bead on the rim by pushing it over the rim flange with the thumbs.

Repeat for the second bead. Take care that the tube will not be damaged by tools or by pinching between tire and rim.

Slowly inflate the tire, checking the tire is seated properly and not pinched as the tire is inflated.

Inflate the tire to the recommended pressure (see tire sidewall).

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.



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 and Pedals

Adjusting the headset (Streetmachine Gte and Grasshopper fx)

The headset bearing supports the front fork in the frame. It has to be adjusted so that the fork with the front wheel turns 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 bicycle back and forth. If the steering head bearing has play the upper cup moves noticeably in contrast to the fixed part.

Tiller steering and Streetmachine Gte under-seat steering:

Loosen the clamping screws facing sideways at the steerer tube and tighten the screw in the A-head cap a bit more.

After having adjusted the bearing play check if the stem is adjusted in a parallel position to the front wheel and tighten the two clamping screws alternately with 6–8 Nm. Check the clamping by trying to turn the stem against the front wheel.



Danger! The hex-headed screw in the cap adjusts the play of the steering head bearing. This screw does not help to clamp the stem tightly to the steerer tube. It does not secure it against turning. Take care that both clamping screws on the side are tightened as prescribed after you have finished your works at the stem. Otherwise the stem may turn while riding and cause an accident.

Aerobar:

Take off the stem as described on page 35 . Loosen the bolt of the clamp above the headset. Use a spacer tube on the fork's steerer which exceeds the steerer's upper end. Use an A-head cap screw it against the A-head star nut already inserted in the steerer tube. Use this screw to adjust the headset bearing play.

After adjusting, tighten the clamp with 6–8 Nm and remove cap and spacer tube.

Put on the stem until it touches the clamp. There must be a “click” sound when the quick release lever is closed which shows that the lever is locked.



Danger! Check if the clamping is strong enough to secure the stem against turning without the alignment bolt being inserted. Readjust the quick release if necessary. The bolt only helps to align the stem and is not intended to transmit forces.

Under seat steering (Grasshopper fx):

Loosen the bolt of the clamp above the headset. Tighten the screw in the A-head cap a bit more. After adjusting the play tighten the clamp with 4–6 Nm.

To check whether the front wheel turns smoothly lift your bicycle at the frame so that the front wheel moves freely above the ground. Lean your bike to the side.

Now the handlebars should move smoothly immediately. 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 undo the clamping screws at the side and loosen the hex-headed screw in the cap a little bit by turning it counter clockwise.

Now move the stem upwards by swinging it a little bit. Check whether the handlebars move freely without touching the frame or the seat.

Headset and Pedals

Adjusting the headset (Speedmachine)

The headset of the Concept Spring contains two not adjustable, industrial bearings. To adjust the play of the fork bearing, please pay attention to the chapter on page 61ff.



Danger! The headset, handlebar, and stem are relevant for the safety of your bicycle. Maintenance and adjustment works require a special knowledge. If you have any question or doubt ask your special dealer for information.

Pedal mounting

The threads of the pedal axles are different for left and right to prevent them from becoming loose while pedaling.

Tightening direction for the pedal axles is in the same direction like the crank turning direction while pedalling forward. Therefore the right pedal has standard thread, the left pedal has left handed thread.

Mount the pedals with grease on the threads.

Use a 15 mm open end wrench or, on some pedal types, a 6 mm Allen key for tightening, and refer to the user's manual of the pedal manufacturer regarding tightening torques.

Suspension

Suspension and damping

Your bicycle is equipped with a rear swingarm for the suspension of the rear wheel and (optionally) a suspension fork for the front wheel. This system compensates slight bumps on the road to make riding more comfortable and to reduce stress for your bicycle.

A well-adjusted suspension improves the traction of your bicycle 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

Often, the terms suspension and damping are used inaccurately 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 bicycle 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 damping and suspension

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

You can ride the bicycle 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 bicycle due to the No Squat design of the suspension system of the bicycle. 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. 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.

Suspension

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 bicycle. 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 bicycle.



Danger! When you adjust the rear suspension and have your hands or a tool on the suspension element, never put any weight on the bicycle, for example by leaning on the seat or loading the carrier. A compression of the rear wheel can crush your hands.

Adjusting to load

The luggage carrier of your recumbent bicycle 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 bicycles there is a lot of suspension travel for a touring bicycle.

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.

Choosing the spring stiffness of the suspension fork

Your suspension fork comes by default with a standard spring that covers a wide range of load and riding styles. If the spring stiffness should not meet your requirements after adjusting the preload or if the suspension bottoms out too much, you can order a spring with different spring stiffness through your dealer and have it mounted there.

It is not important to exactly follow the recommended values for the negative travel, rather follow your feeling how the bicycle behaves during a ride, depending on the road situation. While riding you should only seldom feel the suspension bottoming out. However, in case this never occurs the spring might be too hard which means you don't use the total suspension travel.

Suspension

Suspension fork on Grasshopper fx and Streetmachine Gte

The Streetmachine Gte or Grasshopper fx come with telescopic suspension forks from SPINNER. Please notice the manuals of the respective suspension fork manufacturer that are enclosed.

The suspension travel of the SPINNER fork is 45 mm.

The suspension fork should compress by 30% with rider and luggage on the bike, which corresponds to 12-15 mm (1/2"). Attach a zip tie to one of the stanchion tubes and slide it down on the fork leg's sealing. After getting off your bike you can measure the sag between zip tie and sealing.

You set the recommended value by adjusting the preload of the spring and by selecting the correct spring stiffness. Every model has a turning knob on the fork legs that allows a simple adjustment of the preload.

The suspension fork SPINNER Grind has springs only in the left fork leg.

By turning the knobs clockwise you increase the preload, by turning them counter-clockwise you decrease the preload.

The knob must turn easily. If a knob does not turn any further you have reached the final position. In that case turn back the knob in the other direction for half a turn. Do not turn the knob by force beyond the final position since this will damage the plastic thread inside.

Maintenance of the Spring fork SPINNER



Attention! The following instructions refer to SPINNER Grind2 suspension forks. For other brands please see the instruction manual that comes with the forks.



Danger! Always check the correct position of brakes and wheels after you have worked on the suspension fork as described in the respective chapters. Check that the quick releases are tightly closed.

The steerer tube is firmly pressed and glued into the fork crown, never try to loosen this connection or replace the tube.

Never add additional threads to the steerer tube - there is a risk of breakage!

Inspect the suspension fork before each ride for signs of damage, deformation or corrosion. If the fork has been damaged, do not use your bike any more. Contact your specialist dealer for an inspection.

Exchanging springs

Turn the adjustment knob for the pre-load on the adjustment unit counter-clockwise as far as possible. This causes the spring to relax.

Place a matching spanner or an adjustable wrench on the two parallel surfaces of the pre-load adjustment unit. Then remove the entire unit by turning it counter-clockwise. Carefully remove the springs with one finger or the head of a spoke from the fork.

Alternatively put your bicycle upside down and catch the springs when they fall down. Exchange the springs, lightly grease all parts and assemble the fork again in reverse order. After having finished the assembly please check if the fork works properly by compressing it several times manually.

Lubricating the fork / Dismounting

In order to lubricate the fork have your bicycle mechanic dismount it completely. First remove the pre-load adjustment unit and springs as described under "Exchanging springs".

Undo and remove the screw M6 on the lower part of the leg. To prevent the push rod from turning too press the fork together entirely

Suspension

and hold the push-rod with a long Allen key size 5.

Do the same thing on the other fork leg, too. Now you can pull the fork's upper part out of the lower part.

Now you can pull the fork's upper part out of the lower part. Clean all parts with a cloth. Grease the bushings, legs, springs and threads thoroughly and assemble the fork again.

The bushings, seals and sliding surfaces of the suspension fork suffer from wear and tear through normal use. It depends on the use of the fork, the amount of dirt on it and the maintenance and lubrication how long it lasts.

If the bushings are worn the fork has too much play. Please have your specialist dealer replace the bushings in that case. Hydraulic dampers are affected by wear and tear through normal use. It depends on the usage of the bike, the amount of dirt on it and the maintenance and lubrication how long it lasts.

Wear of the bushings is indicated by clear play in the fork. In this case, have the bushings replaced by your specialist dealer.

Concept spring fork on Speedmachine

Shock boot

The dust boot is very important for the functionality and the lasting of your fork. Unlike many other suspension forks the CONCEPT suspension system has a closed dust boot, that means it also does not show any openings for ventilation since the ventilation happens within the steerer tube into the clean air inside the frame.

Please check the correct and sealed position of the dust boot at the top and the bottom before each ride. At the bottom the dust boot shows a slot on the inside that has to fit the washer above the fork crown. Also check the condition of the dust boot. In no case may it show any cracks or holes. If any dust or dirt enters due to wrong assembly or damage the wear of the bushings and the spline mechanism increases considerably.

Changing the spring

If the spring stiffness does not meet your needs you can order another spring with a different stiffness from your dealer and have him mount it.

You can distinguish the dismantled springs by their color:

- medium, 19 N/mm: red
- hard, 24 N/mm, yellow

(Values valid for Concept-suspension from 10/2005 on.)



Attention! The following assembly instructions are for the bicycle mechanic:

You can exchange the springs from the bottom of the fork.

Dismount the front wheel. If a mudguard is mounted you will have to undo the screw at the fork crown and remove the mudguard. Clean the fork and the dust boot diligently.

Suspension

Then remove the snap ring inside the lower end of the steerer tube.

Please keep in mind that there is a slight preload on the spring and that it comes out quickly together with the lower spring support after you have removed the ring.

Remove the washer, the spacer and the lower spring support. The upper spring support and the foil insert that surrounds the coil spring might come out, too.

Change the spring and attach the lower spring supports. Push the foil insert back over the spring.

Then put the whole package back into the steerer tube. Spacers that may come with the spare spring have to be mounted below the spring.

The spacer has a hole for the screw of the mudguard. Align the hole in the spacer with the thread on the back of the fork crown and push the spacer in the steerer tube.

The upper spring support has to click in noticeably on the lower end of the piston rod in the steerer tube so that there is only a 3 mm preload of the spring necessary to put back the safety ring in its position in the slot in the steerer tube.



Attention! In any case either the spring support or a spacer has to be directly over the safety ring, never the spring itself.

In order to check whether the safety ring is correctly seated in its slot take a screwdriver and push slightly on the ring, it must not move then.

Before taking a first test ride always check whether all parts have been mounted correctly and the fork works smoothly by pushing several times on the frame of the parked bicycle.

Lubrication

After some use it may be advantageous for the performance to lubricate the fork after it has been dismounted and after the bushings have been cleaned.

Only use the special Concept lube, this lubricant is for the use at the upper bushing and the elastomer strip of the Linear Friction System below the upper bushing.

You can buy this lubricant from your HP VELOTECHNIK dealer Put your bicycle on a work stand so that you can dismount the front wheel and the front fork.

Dismount all add-on parts from the fork (front wheel, brakes, computer sensor etc.). Undo the clamping screw of the stem.

Unscrew the end cap from the outer tube. Then remove the end cap by unscrewing the hex headed screw on its top. The end cap must be held tight. You may have to hold the piston rod under the fitting cap in place.

Now cautiously pull the fork down out of the outer tube. Take care that you don't turn the outer tube relative to the inner steerer tube while working on it, since the fork has to be remounted in exactly the same position as it has been dismounted. Therefore mark both tubes with a pen in order to keep the correct position.

Clean all bushings and surfaces with a dry cloth. For lubrication only use the appropriate lubricant recommended by us. Other lubricants or chemical cleansing agents may have a negative impact on the performance of the synthetic bushes or the linear friction damping system. Apply the lube thinly and evenly to the surface of the spline guide and the entire surface of the steerer tube as well as the inside of the lower and the upper bushing. Finally remount all parts in reverse order.

In doing this take care that you keep the position of the steerer tube in relation to the outer tube as described above. The spline

Suspension

guide of the lower bushing must not be damaged while inserting in the steerer tube.

The conical ring below the upper bushing must face downward with the slope surface. The upper bushing and the spacers must not come out at the top while inserting the steerer tube.

Adjusting the fork play (instructions for the mechanic)

The linear support of the suspension fork and the transmission of the steering forces is done by a spline system in the steerer tube and the lower bushing. With the practical adjusting system you can adjust both the smooth performance of the system and the range of the play through the lower adjusting nuts.

It may be necessary to adjust the bearing after the first break-in phase; later on the adjustment is only necessary in exception. The adjustment of the fork play requires special tools and skills.



Attention! The following section refers to the expert. The adjusting nuts for the fork play are protected through the frame tube, therefore you will have to dismount the fork prior to adjusting it.

Dismounting the fork

Dismount all add-on parts (front wheel, brakes, computer sensor etc.) from the fork. Undo the clamping screw of the stem and remove the stem together with the bearing cover from the top of the outer tube.

Grab the dust boot at the top and remove it from the lock nuts at the lower end of the outer tube.

Now take a rubber mallet and carefully hit the cap to remove the outer tube by pressing it downwards through the bearings.

After you have unmounted the fork you can also unmount the bearings and the upper bearing-cup with a fitting soft aluminum tube.

This is not necessary when you only want to adjust the fork play.

Adjusting the bushing

The lower bushing is conically shaped at the outside. It fits in a corresponding conically shaped part of the outer tube.

By turning the lower nut the bearing is pushed into the outer tube and thus squeezed together which reduces the play between the bushing and the inner steerer tube.

First undo the two adjusting nuts by undoing the lock nut that lies above and then undoing or tightening the lower nut until the steering moves smoothly and has optimum play.

Please note that the bushing has possibly to be pushed out of its conically shaped fitting again when the adjustment is too tight.

Then you tighten the lock nuts against the lower nut and refit the dust bag in its slot between the lock nuts.

If you have underseat steering, the adapter is placed between the locking nut and the tightening nut. It must not have any play when mounted in the guiding and it has to be fixed tightly with the nuts.

Mounting the fork

If the lower bearing (metric, inner diameter 40 mm) has been dismantled from the other steerer tube, remount it with a tool (tube, inner diameter approx. 40,5 mm, outer diameter approx. 51,5 mm).

Push the outer tube of the fork from below through the head tube until the lower bearing fits the frame. Push the upper bearing (metric, inner diameter 40 mm) on the outer tube and fit it into the upper housing. Refit the bearing cover and the stem.

It is very important that all bearings fit their housings completely. For this purpose dismount the front wheel and the brake and put the bicycle on the ground. Put the tool above

Suspension

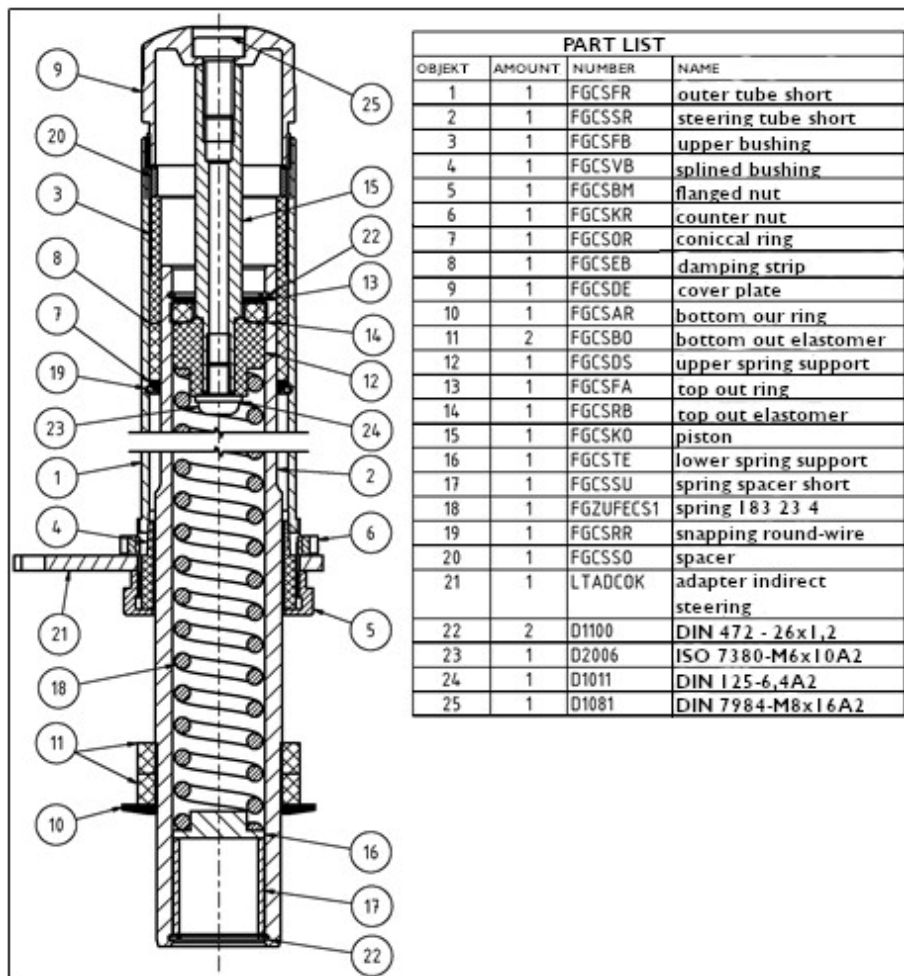
the stem on the outer tube and press all bearings into their beadings by hitting lightly on the tool.

In order to check the correct fitting of the bearings see if the following criteria are fulfilled:

- the bearing cover has no play between the bearing and the stem, and it can only be turned with effort

- the upper edge of the bearing lies in accordance with the upper edge of the frame.

Finally make the front wheel of your bicycle bounce several times heavily on the ground to check whether the bearings still fit tightly. The criteria mentioned above still have to be fulfilled after this test.



Part list of the Concept fork for a Speedmachine

Suspension

Rear suspension element



Danger! While adjusting the rear suspension element never load the bicycle 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 standard rear suspension is a damper 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 bicycle 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 bicycle while standing still.

Therefore, it is necessary that you have the correct spring stiffness according to your

weight. (In "Changing the steel spring (DV-22)" on page 66 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 bicycle is unloaded as well as while sitting on the bicycle in riding position. Also, take into account possible luggage. Find out the total suspension travel possible for your bicycle 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 bicycle 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.



Steel spring suspension element with fixed damping rate.

Suspension

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 bicycle 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.



Inserting the spacer clip

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:

Load Spring stiffness

Grasshopper fx:

- up to 80 kg: 450 lbs/inch
- up to 110 kg: 650 lbs/inch
- up to 140 kg: 850 lbs/inch

•

Streetmachine Gte

- up to 80 kg: 350 lbs/inch
- up to 110 kg: 450 lbs/inch
- up to 140 kg: 550 lbs/inch

•

Speedmachine:

- up to 80 kg: 450 lbs/inch
- up to 110 kg: 550 lbs/inch
- up to 140 kg: 650 lbs/inch

Suspension

In addition to this, your dealer can also use springs with other spring rates or special light-weight 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:
DV22: 83 mm (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 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 your new bicycle" on page 22ff.

Cleaning and lubricating

Do clean the suspension element, especially the polished piston rod, if it is dirty.

Suspension

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.

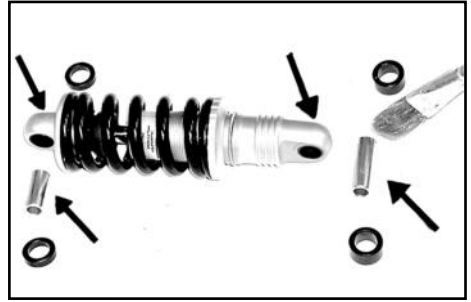
From time to time grease the thread for the spring pre-load with a drop of acid-free oil. Thus, you can always turn the adjustment ring easily by hand. Once a year you have to grease the pivots of the suspension element. For that purpose dismount the suspension element as described under "Changing the steel spring" on page 66.

Remove the plastic spacers and pull the metal tube out off 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 bicycle, 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.



Attention! Please also note the maintenance instructions of the damper manufacturer provided with your bicycle.



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

Suspension

pressure (about 0,5–1 bar). Take off the pump quickly.

Recommended pressure setting for
ROCKSHOX MONARCH:

(Maximum allowed pressure: 18 bar.)

<u>Load</u>	<u>Positive chamber</u>
-------------	-------------------------

Grasshopper fx:

- up to 80 kg: 7,5 bar
- up to 110 kg: 9,5 bar
- up to 140 kg: 10,5 bar
-

Streetmachine Gte

- up to 80 kg: 6,5 bar
- up to 110 kg: 7,5 bar
- up to 140 kg: 9,0 bar
-

Speedmachine:

- up to 80 kg: 7,5 bar
- up to 110 kg: 8,5 bar
- up to 140 kg: 9,5 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 bicycle 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 bicycle 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 too 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 Bicycle also increases your riding safety.

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

Suspension



Adjust the damping of the ROCKSHOX Monarch by turning the red knob. The shock must be installed with the lock-out lever on the backside facing upwards

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 bicycle down while you are sitting on the bicycle 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.

Swingarm pivot

Swingarm pivot

The rear swingarm pivot comes with maintenance free bushings. They feature a self lubricating system with Teflon particles. The bushings 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 keep the axle in the frame. They have to be secured with thread locker.

Tightening torque: 17–19 Nm
(Please follow the tightening torque settings listed in the table on page 76)



Danger! If the screws at the axle are not tight enough this leads to play and noises when the spring compresses. In extreme cases the swingarm may come loose which leads to a serious fall. If the screws are too tight the thread of the axle may tear out or the screw may be damaged.

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.

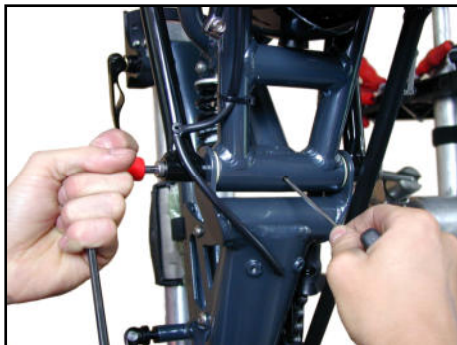
Unscrewing the axle bolts

Before being able to unscrew the axle bolts a possible rear rack must be disassembled. To do so both lower screws of the rear rack must be unscrewed completely, both upper screws must be loosened. Then, the rear rack can be swivelled upwards.

In case the rear swingarm is to be dismantled completely you can prevent the axle from turning by inserting a thin metal rod in the hole of the axle through the hole in the rear swingarm under the axle.



Attention! There has to be a big washer between the main frame and the end of the bushing else the bushing is not able to function without play and the frame will be damaged.



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

Kickstand, Mudguards, Water bottle cage

Kickstand



Danger! Before every ride check whether the kickstand is lifted up to its riding position. With a recumbent, kickstands are often forgotten. In the first left turn the kickstand can touch the ground and cause a fall! After a fall, you will have to check the kickstand and the area where it is mounted for damage and deformation.

Depending on your model, you can use a rear kickstand at the frame or a kickstand that comes with the optional lowrider.

You get maximum effect with the kickstand at the lowrider. It supports the bicycle at the middle of the bike between the wheels.

The left rear dropout has mounting holes for a PLETSCHER kickstand. The screws are put through the dropout and secured with washers and self-securing nuts. Tightening torque is 7–9 Nm. If you do not apply the correct tightening torque, the screws might become loose or break.

Before riding check that the kickstand does not affect the function of other parts in any position. The kickstand is only suitable for parking the bike on even, solid ground.

In case of unfortified ground, luggage load or mounted fairings we recommend leaning the bike securely against a solid wall or pole.

Mudguards

At bicycles with suspension mudguards are exposed to very strong vibrations which may cause cracks and breaking. Please check the stays of the mudguard regularly for their position and check the mudguards for cracks or deformations. Immediately exchange damaged mudguards.



Attention! You must not mount additional parts like rear lights or reflectors to the mudguards since they may break then.



Attention! 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.

In order to prevent falls you have to fasten the stays of the front mudguard with a security clip that opens under pressure. When the clip has opened once please replace it with a new one.

After you have performed service work or replaced mudguards check if the wheels turn freely. A distance of at least 7 mm has to be between mudguard and wheel.

Check whether the suspension can still fully compress with mudguards mounted. The mudguards, stays and screws must not touch other parts even under maximum compression.

Water bottle cages

The derailleur tube at the front of the frame comes with threaded inserts for a water bottle cage.

Additional water bottle cages can be mounted using a special bracket behind the seat available from HP VELOTECHNIK.

Another 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 onto the rear rack.

Maintenance routine

Regular maintenance

Your bicycle 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 Warranty Pass on the last page.



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 life-time 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.

Carbon parts

Carbon bicycle parts need special care. Please pay attention to the following instructions on storing, assembly and maintenance.

Check carbon parts carefully after crashes.

The surface of the parts must not be damaged, have scratches, holes or any kind of optical variation. The carbon fabric must not have ruptured fibres.

If you notice any noises that you can not define, ask your special dealer. If you have any doubt, change the carbon parts.

Exceeding tightening torques is very dangerous for carbon part. Watch the manufacturer's manual and the table on page 79 for tightening torques and mounting instructions and use a torque wrench.

Never use common grease but special products for carbon parts.

High temperatures may also damage carbon parts or influence their stability.

Never clamp carbon parts for example while hanging your bike assembly stands or car racks.

Cleaning and conservation

The frame of the bicycle 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.

Maintenance routine

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 with 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-re-greasing rinsing agent.



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.

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 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 bicycle, 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 49.

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 Grasshopper fx 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".

Maintenance routine

- 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 chainring. That way the cables are in the most relaxed position.
- The tubes of your tires loose 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 bicycle 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 bicycle at the frame only.

Please remove any parts that could come loose during transport (seat cushion, water bottles, luggage bags, pumps, pennants, etc.).



Attention! Never clamp the bicycle on carbon parts (depending on your options like the carbon front boom or spring fork) when transporting. The parts may be damaged.

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) 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 collection point.

Maintenance routine

Tightening torques

The values indicated are meant for a friction value $\mu=0,125$ (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	Bolt	Tightening torque
disc brake			
- brake lever	handlebar/brake lever clamping	M6 size 5	4 Nm
- brake caliper	caliper/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 (Grasshopper fx)	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		50-60Mn
chain idler	chain idler/frame	M8 size 6	17-19 Nm
crank	crank/axle	size 8	35 Nm
	chainring screws	size 5	8-11 Nm
hub	cassette ring		38-42 Nm
	screw axle	SW15	*
	quick release axle		See page 11
	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 mounting rail/frame	M5 SW3	5-6 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	6-8 Nm
USS-steering (direct)	stem/Steerer tube	M6 size 5	6-8 Nm
underseat steering stem	length adjustment	M6 size 5	6-8 Nm
	axle/axle cap	size 6	12-14 Nm
(Grasshopper fx)	adaptor/steerer tube	M8 size 6	23-25 Nm
	headset clamp	M6 size 5	4-6 Nm
	steering rod/mounts	M5 size 5	7-9 Nm
Tillerbar stem	stem/fork	M6 size 5	6-8 Nm
	height adjustment	M8 size 6	8-10 Nm
Aeorbar stem	stem/steerer tube	M6 size 5	6-8 Nm
	length adjustment clamp	M6 size 5	6-8 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 policy

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.

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 bicycle is also not covered. The onus rests with the purchaser. The warranty is void if any of the instructions in this manual are neglected.

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.

The warranty is void when using the bicycle for commercial purpose such as rental or leasing

The warranty starts with the date of purchase (receipt of the bicycle dealer) of a new

bicycle. The warranty is processed via the bicycle dealer who ordered the bicycle from us.

In case of damage the dealer has to send the damaged frame to us so that we can check it, if asked to do so by us.

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 bicycle 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

With the HP VELOTECHNIK Warranty Pass you can assure the safety and proper function of your bicycle for many years.

Like any other vehicle your bicycle 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 bicycle to a qualified bicycle mechanic for a thorough check.

The service plan on the end of this manual 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.

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:

telephone:

frame no. (see page 13 and following 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 signature and stamp:

Warranty pass

Service at delivery

At the delivery of the new bicycle

Order No.:

mileage approx. km:

Date:

Dealer's Stamp and Signature:

Ist. service

No later than 300 kilometres or 2 months after the purchase.

Order No.:

mileage approx. km:

Date:

Dealer's Stamp and Signature:

Exchanged or additionally mounted parts:

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.)

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 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 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 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 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 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 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 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 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 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 or additionally mounted parts:

Warranty pass

12h. Service

No later than 27000 kilometres or nine years after the purchase.

Order No.:

mileage approx. km:

Date:

Dealer's Stamp and Signature:

Exchanged or additionally mounted parts:

13h. service

No later than 30000 kilometres or ten years after the purchase.

Order No.:

mileage approx. km:

Date:

Dealer's Stamp and Signature:

Exchanged 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.

Service plan

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 fork	check shock boot and clean stanchion tube disassemble, lubricate check for play replace worn out parts
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
chain tubes	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	no headset used on full suspension models (service suspension strut bearings in-
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

see page	before every	monthly	annually	note
44	• •		◆	
54	•	•		
45	• • •	•		
58		•	• ◆	
60ff		• •	• ◆	every 6 months
71			◆ ◆	
			◆	
49		•		
51		•	◆	
53		•	◆	
		•		
54		•		
		•	◆	
56		•		
			◆ ◆	
	•	• •		
11	• •			
		•		
10		•		
72		•		
	•			
	•		◆	recommended interval to replace aluminium stem: 2 years
46/48			◆	

INFO
recumbent
technology



HP
VELOTECHNIK

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Elektrische Hilfsantriebe

Die Ausstattung mit anderen elektrischen Hilfsantrieben als den von HP VELOTECHNIK ausdrücklich für das jeweilige Fahrzeugmodell freigegebenen Hilfsantrieben ist nicht zulässig.



Gefahr! HP VELOTECHNIK Liegeräder können durch die Verwendung von nicht durch HP VELOTECHNIK freigegebenen Antriebsteilen beschädigt werden. Zum Beispiel kann ein Rahmenbruch auftreten. Diese Schäden können zu Unfällen mit Verletzungen bis hin zur Todesfolge führen.

Die verwendeten Antriebsteile dürfen unter keinen Umständen zu höheren Kettenkräften führen, als sie durch original von HP VELOTECHNIK verbaute Komponenten hervorgerufen werden.

HP VELOTECHNIK verweist ausdrücklich auf die in der Originalbetriebsanleitung beschriebenen Konsequenzen durch den Einbau von nicht freigegebenen Komponenten auf die Garantie. Das entsprechende Kapitel finden Sie unmittelbar vor den Inspektionsnachweisen.

Electric assist

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.