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GrassHopper fx
HYBRID-ELECTRIC-TRICYCLE



HP08
velotechnik



Operating Manual and Service Instructions

February 2008

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Introduction

Dear customer,

thank you for buying a recumbent bike designed by HP VELO-TECHNIK and congratulations on the purchase of your new GrassHopper or foldable GrassHopper fx! With the GrassHopper, a high-quality touring bike, 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 bike is designed with the latest bicycle technology by HP VELOTECHNIK that partly needs special treatment and care.

In this manual you will find detailed instructions on how to optimise your GrassHopper to meet your demands and riding style as well as your size and weight. In addition to this, we have put together a collection of information on care and maintenance as well as special technical advice from our engineers. Important: Please send us the attached warranty registration form for your extended warranty (see *page 58*.)

This guide helps you to keep your GrassHopper in perfect condition so that you will always have 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**

Introduction

To this user manual also belong the original manuals of component manufacturers such as the brake manufacturer, the gear system manufacturer and the pedal manufacturer. These manuals tell you in detail how to operate and maintain those specific parts. Please do read the manuals of the part manufacturers as carefully as the manual on hand. Please have other users of your recumbent also read the manuals before using the bike.

The maintenance and adjustment of 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.

The instructions in this manual apply only to a completely assembled GrassHopper with standard parts from the series production of HP VELOTECHNIK.

On special demand HP VELOTECHNIK delivers frame kits with which a specialist dealer can assemble a bicycle individually. In this case the manuals on the operation and maintenance of the parts only represent a guideline, please do read every manual of every part manufacturer. The specialist dealer is responsible for the expert assembly, please contact him for detailed advice! 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.

Caution! The texts in the gray boxes are particularly important for your safety. Texts that begin with "**Danger!**" mark an immediate danger for your life and your health. Please do read them carefully.



General Safety Instructions

Intended use

Your GrassHopper is a bicycle for the use on streets and surfaced 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.

Damage through inappropriate use, assembly errors, accidents or similar activities and willful damage results in the loss of any warranty.

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

The first miles

The first 300 km (186 miles) are an important phase in which you break in the bicycle. During the first use of a new bicycle the screws may bed in and come loose. Cables and spokes may stretch. Bearings may show play. Please be very attentive during that period.

After 300 km or after two months at the latest you will have to take your bicycle to a bicycle mechanic for the first service. Please record this first service and the tasks performed in the warranty pass on *page 59*. This first service is the prerequisite for further use of the bicycle and for your warranty claims.

Legal requirements

When you ride your bike on the public road it must comply with national legislation and guidelines. These will vary from country to country.

In general, there are minimum standards for brakes, reflectors and lighting systems, as well as usually a general duty to ensure that your vehicle is in roadworthy safe condition. There will also be a duty to ride in a safe and responsible manner. If you ride your HP VELOTECHNIK bike 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.

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

General Safety Instructions

Load capacity

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. 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, *page 16*.

With an attached trailer, the maximum total weight must not be higher than 150 kg (330 lbs)

Carrying luggage

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

Maximum load:

Rear rack 25 kg (57 lbs)

Lowrider under the seat 25 kg (57 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 ($\frac{1}{3}$ ") 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.

Additional loading can influence the handling of your bike considerably. If you plan on riding with heavy luggage we advise you to make a test ride on a street with no traffic to adjust 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 center 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 may loose parts like straps or belts 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 could fall down and be damaged.

Transport in the car

The best way of transporting your bicycle is inside the car. See 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.

Caution! Do not fasten your bicycle at the handlebar or, with disassembled wheels, at the dropouts. The wind causes violent forces that can stress the parts and therefore may cause damage. Such damage may not be noticed immediately.

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

Do not take kids with you

The GrassHopper is not designed for the transport of children. You are not allowed to mount a child's seat. It is only allowed to transport children in a trailer that has been specially designed for that purpose.

Trailers

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

Added parts and accessories

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

Caution! 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.

Take care that the handlebar and the suspension always stay mobile. You may 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 bike 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.

Fairings

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

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

General Safety Instructions

Replacement of parts

The replacement of parts relevant for safety (especially brakes, light system, stem, handlebar, fork, 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, fork, handlebar, seat mounts, 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!

No alteration of parts

Caution! You are not allowed to perform any work on 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 through direct damage or increased susceptibility to corrosion.

Final assembly

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

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

All screws must be checked and tightened, especially on the handlebar, stem, fork, swing arm pivot and wheels. Please follow the tightening torque settings listed in the table on *page 57*.

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

Screws and bolts

Caution! Screws must be tightened with prescribed tightening torque. In this manual tightening torques are given in "Nm" (Newtonmeter). Always use a torque wrench wherever a torque setting is given in this manual. Never rely on "feel". 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 a table with the prescribed torque settings on *page 57* in this manual.

Adjusting the leg length

Before the first ride: adjusting your new GrassHopper

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

In order to adapt the GrassHopper 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.

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.

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

Adjusting the leg length: moving the front boom

In order to adjust the leg length you have to move the front boom (the front part of the frame where the cranks are mounted) within the main frame. Unscrew the screw M8x35 under the main tube with a 6 mm Allen key. Take a grip on the front changer tube or both cranks and move the front boom into the frame or pull it out while cautiously turning it.

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



Unscrew the clamping screw to adjust the front boom.

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

Adjusting the leg length

In order to check the adjustments have another person hold the bicycle while you are sitting on the recumbent.

Adjust the front boom in such 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 bike.

While you are pedaling, the ball of your foot should be positioned over the center 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 great it is difficult to overcome this dead point, pedaling 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 or your legs may bump on the handlebar.



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

For riders with a short leg length the front boom has to be cut by a bicycle mechanic, so that it can be inserted to the maximum. 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.

Caution! 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 near the fork. Please inform yourself about the length of the front boom on your bike 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.

Adjust the front boom so that the bottom bracket axle is horizontal when you look at it from the front. For that purpose 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 changer tube above. Then sit on your bicycle and check the position. (Hint: When you have the impression that the bottom bracket is turned alternately to the left and then to the right when cycling you will have found the correct middle position).

Tighten the screw with a torque wrench (tightening torque 14–16 Nm). On your first ride check whether there is sufficient clamping.

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



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



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

Caution! The minimum insertion depth of the front boom into the main frame is 10 cm (4"). In no case may the end of the front boom be visible in the clamping slot when you look at the main frame from below, since it may result in a damage of the frame.



If the spacer is missing or not aligned properly or the screws are tightened too much, the frame can break!

Danger! In the opening of the main frame there must be a spacer (a slotted tube of black plastic with edges to the front and the clamping slot) that is glued into the frame. This spacer ensures safe clamping of the front boom and protects the paint. It is important that you take care that this spacer is always visible at the front end of the main frame. The lower slot has to be aligned in accordance with the slot in the main frame. If this spacer is missing or is moved to the back of the tube while inserting the front boom, secure 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 spacer will lead to a frame damage.

Danger! If the screws 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 a dangerous fall.

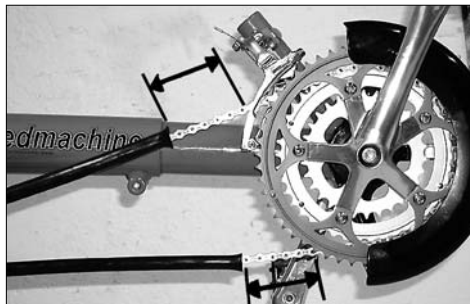
Adjusting the leg length

When moving the bottom bracket tube your dealer has to adjust the chain length. By default the GrassHopper comes with a very long chain so that the adjustment range of the bicycle can be fully used without the need to lengthen the chain.

After the first adjustment of the leg length that you have done together with your dealer while handing over the bicycle, the chain has to be shortened so that the arm of the derailleur is not fully turned forward while shifting on the big chain ring in front and the big 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 has to be closed with a special closing link or a chain riveting tool that expands the rivet while riveting (i.e. ROHLOFF-Revolver). A poorly joined chain may break and thus lead to a fall. Have adjustments of the chain length or the changing of the chain be done by your bicycle mechanic.

Caution! Take care that the chain tubes have at least a clearance of 5 cm (2") to the rear derailleur and the front changer even under maximum tension of the chain and that the tubes stay 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 into the rotating drive train it could be locked-up and destroyed. The end of the chain tubes have to be tightly secured with 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.

After you have adjusted the front boom you should seal the gap in the clamping slot between the front boom and the main frame with wax or silicone in order to protect your frame from the penetration of water and dirt and hence damage through corrosion which may lead to a broken frame.

We recommend to slightly readjust the front boom every 3 months so that knees, muscles and ankles will be used differently, and you might find a more comfortable and more efficient riding position.

A wrong adjustment may lead to pain in your knees and inefficient pedaling. In addition we recommend to ride with a high pedaling cadence, which means to pedal fast and with little pressure. Pedalling with too much pressure may also lead to pain in the knees. You will find more information about this on [page 26](#).

Adjusting the seat position

Adjusting the seat length

Your GrassHopper is equipped either with the ErgoMesh® mesh seat or the adjustable BodyLink® seat from HP VELOTECHNIK.

The following instructions refer to the BodyLink seat. Length, seat back angle and lower seat angle are adjustable for this seat. 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 back when you are in the most upright position, or when you hit the upper seat edge with the back of your head when you look upwards.

Adjusting the seat length

Take off the seat cover (see page 51). 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 SW4 a few turns. Step behind your bike 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

Caution! 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.

Caution! To avoid noise from the seat when loaded, the contact surfaces between the two seat halves need to be separated by self-adhesive plastic sheets and all contact surfaces of seat and seat mounts 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 mount of the upper part, and place it in the desired position, then fasten the velcro.

Adjusting the seat back angle

A big advantage of the BodyLink® seat on your GrassHopper is that you can 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 aluminum seat mount. You can adjust the seat back angle by 10 degrees by simply opening the quick release lever. In the medium seat position the angle is about 35° from horizontal.

Adjusting the seat position

Adjusting the seat back angle is easy when you push the seat closely to the seat mount into the desired position. By pulling at the upper seat edge, you would twist the seat, creating tension and locking up the adjustment mechanism.

Because of the flexibility of the BodyLink® seat and the special cam shape of the seat mounts, the seat effectively pivots around a central axis, approximately in the area of the lower lumbar vertebrae. This is the place where you support the biggest part of your pedaling 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 has no inner tension. Thus you need less force for the adjustment. Push or pull the seat front edge firmly until you 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 to 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 pedaling 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 opposite to each other.

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

To get less lumbar support, rise the front seat edge and put the seat back more upright. For more extreme adjustments, loosen the 4 screws for the seat length adjustment in the seat back. Thus the seat back can expand and bend into the desired shape. Tighten the screws and quick releases as described above.

Caution! The two quick releases have to be closed firmly (tightening force 15-20 kg / 45 lbs) to safely hold the seat. You are not allowed to open them while riding. After they have been closed the imprint "close" must be visible. If the quick releases are not tightened appropriately the seat can move while riding so that you may no more be able to control your bicycle.

Height adjustment of the head rest

The BodyLink® seat can be fitted with an optional head rest. The head rest cushion is attached to the flexible mount with velcro tape. You can adjust its height within an inch, so that it fits under the edge of your helmet. The cushion should support your upper neck and lower head when leaning your head back.

Caution! Do not push or carry your bike on the head rest, this could damage the head rest or your seat!

Adjusting the handlebars

Adjusting the above seat steering handlebars

Your GrassHopper with above seat steering is equipped with a height adjustable and foldable stem. It comes with the Glideflex folding pivot from TERRACYCLE.

Alignment of the stem to the front wheel

Danger! Aligning the stem can require adjustment of the head set 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 both 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 8–10 Nm. Check the clamping by trying to turn the stem against the front wheel. Check the play of the head set bearing, see page 50.

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.

Height adjustment of the handlebars

The stem is height adjustable by telescopically sliding the stem extension on the lower part. Loosen the clamping screw of the clamp at the lower end of 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 4–6 Nm.

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.

Angle adjustment of the folding stem

The Glideflex 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 with a 4 mm allen wrench. Turning the bolt in (clockwise) allows the handlebars to fold further back; turning the bolt out stops the handlebars from going as far back.

Caution! 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.

Adjusting the folding friction

To adjust the folding friction, tighten or loosen the pivot bolt with a 5 mm allen wrench. Tightening the bolt will increase friction; loosening will decrease friction.

Adjusting the handlebars

Danger! Do not loosen the bolt past the minimum friction point. If you do, retighten the bolt until you can feel the friction increase. The bolt must be secured with Loctite.

The friction adjustment should not need frequent readjustment in normal use. Sometimes, rain will cause the friction to drop slightly, but things should go back to normal when dried out.

Adjusting the under seat steering handlebars

Your GrassHopper with under seat 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 steerer 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. 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 QR. The ability to turn is designed on purpose: In case the bike drops over the handlebars can turn without being bent or broken immediately.

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

Danger! The minimum insertion depth of the stem half is 5 cm (2"). In no case may the rear end of the inserted stem half become visible in the clamping slot.

Caution! On the left side of the handlebars there is a foam liner to protect the paint where the handlebar touches the frame. Check that it is in the correct position and replace it when worn or lost.

Alignment of the handlebars to the wheel

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.

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.

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

Never adjust the alignment of the handlebars to the front wheel by changing the length of the steerer rod! The distance between the two rod pivots is a fixed measure. The adaptor must stay perpendicular to the front wheel, or the front wheel could suddenly turn in sharp corners!

Adjusting the handlebar angle

By changing the angle of the handlebars you can adjust the position of the grip to the length of your upper body and your arms.

Above seat 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.

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 the lesser is the maximum possible cramp of the handlebars, since it touches your legs earlier.

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 8–10 Nm. Check the correct clamping of the handlebars by mounting your bike and pulling the handlebars. In doing so the handlebar grips must not turn.

Please take care that the clamping area of the stem is thoroughly trimmed and does not have any sharp edges which may lead to a rupture of the handlebars.

While riding you should allow your arms to rest in a relaxed position on the handlebars. Do not 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 turn in a stem that is not sufficiently clamped the handlebars or the stem might be damaged or deformed. In that case a secure clamping can no longer be guaranteed, even with the correct tightening torque, and handlebars and stem have to be exchanged.

Adjusting the cable length

Caution! After you have adjusted the handlebar position you have to adjust the length of the brake cables and shifter cables. The cables have to run smoothly without any sharp turns and they may not be bent sharply or stretched when the handlebar is at maximum cramping or the above seat steering stem is folded forwards. Also avoid large arches that could be caught up in other parts.

You can make smaller adjustments by moving the cables in their guides at the frame and the stem, so that there is enough room at all mobile parts. If this proves not to be sufficient you will have to have your specialist dealer shorten the cables or replace them by longer cables.

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

Handlebar grips

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

Adjusting the suspension

Purpose of the adjustment of the suspension

Your GrassHopper is fitted with a suspension fork for the front wheel and a rear swing arm for the suspension of the rear wheel. This system compensates slight bumps on the road so that riding is comfortable and the strain on your bicycle is reduced.

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 the 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 pedaling influence, rhythmic body movements or permanent wavy underground

Suspension and damping

The suspension systems of the suspension fork and the rear swing arm are fitted with the actual springs and dampers, which are mounted separately.

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

The **spring** is the elastic element that compresses and decompresses through the load, which occurs on bumpy roads. While decompressing the spring releases the same energy it has saved during compression.

The front fork of your recumbent bike is fitted with steel coil springs and springs made of microcellular foam elastomers. (MCU). The rear swing arm is suspended with steel coil springs in the standard version. The optional rear shock DT-Swiss XMI80 uses air as spring medium.

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

The hydraulic damping of the rear suspension is adjustable, in case you have mounted the optional suspension element DT-Swiss XMI80.

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 GrassHopper with a considerably lower damping 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 pedaling forces have very little influence on the suspension of the bicycle due to the No Squat design of the suspension system of the GrassHopper. So when you adjust the damping, always start with a low damping.

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 Millimeters) or "lbs./inch" (Pounds per Inch). Sometimes you only find "lbs." printed on the springs.

The spring stiffness of the optional air shock DT-Swiss XM180 is set by adjusting the air pressure.

The suspension is designed in a way that the spring compresses considerably when you mount your bicycle. This is called negative suspension travel (or "sag") and it enables the bicycle to decompress on bumpy roads. (Which 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 fully suspended recumbent bike designed by HP VELOTECHNIK.

Adjusting to load

The luggage carriers of the GrassHopper are 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 would be mounted to the unsuspended parts, e.g. the rear swing arm.

Additional luggage changes the load of the wheels and their suspension. The suspensions are more compressed through the load. That way, there is less suspension travel for bumps while riding. Your suspension could seize up 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 is there 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 this 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 would have to exchange the spring for another spring with another spring stiffness. In practice you can often do without it: the GrassHopper offers with 90 mm (3 1/2") a lot of suspension travel for a touring bike. When you choose the spring stiffness so that the full 90 mm are 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 DT-Swiss XM180 can be easily pumped up to compensate load increases.

Adjusting the suspension

Adjusting the suspension fork

The front fork of the GrassHopper comes with telescopic suspension forks from SPINNER or MEKS.

At your request different types of suspension forks can be mounted to your GrassHopper, please notice the manuals of the suspension fork manufacturer that are possibly enclosed.

The suspension travel of the SPINNER fork is 45 mm, of the MEKS fork approximately 50 mm (2").

The suspension fork should compress by 30% while mounting the bike, which corresponds to 12-15 mm (1/2")

You set this value by adjusting the pre-load of the spring, provided you chose the correct spring stiffness (*page. 19*).

Every model has a turning knob on the fork legs that allows a simple adjustment of the pre-load.

The suspension fork MEKS Carbon All has springs in both fork legs, the suspension fork MEKS Carbon AC has springs only in the left fork leg since the other fork leg contains a hydraulic damping cartridge.

By turning the knobs clockwise you increase the pre-load, by turning them anti clockwise you decrease the pre-load.

It is sufficient to set the pre-load in the two fork legs to approximately the same level. It is not necessary to match them exactly.

The knob must turn easily. If a knob does not turn any further you have reached the final position. In that case turn the knob again in the other direction about half a turn.

Do not turn the knob by force beyond the final position since this will damage the plastic thread inside.

The suspension fork MEKS Carbon AC is fitted with a hydraulic damping unit. On the right fork leg is a turning knob to adjust the damping.

You increase the damping by turning the knob clockwise.

We recommend you to start with the lowest possible damping. Only when the fork oscillates more than once after you have gone over a bump should you increase the damping.

When the fork works fine when passing a single bump but stiffens distinctly when passing several bumps that come quickly in a row, the damping is too high. However, when the fork "jumps" during the rebound movement the damping has to be increased.

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 pre-load or if the suspension bottoms out too much, you can order a spring with another spring stiffness through your dealer and have it mounted there. For more information see *page 43*.

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.

Adjusting the suspension

Adjusting the rear suspension element

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

For the rear suspension of the GrassHopper a spring element is combined with a hydraulic damping unit in a suspension element. The damping results from fluid friction of an oil flow through thin holes of a throttle 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 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 GrassHopper comes standard with a steel spring rear shock. As an option you can get the air shock DT-Swiss XMI80 that uses air as spring medium.

Steel spring rear shock

The pre-load determines how far the suspension compresses when you are sitting on the bicycle while standing still.

For the rear wheel the same guidelines as for the suspension fork are valid: for maximum riding comfort the suspension should compress by about 30% of the total suspension travel while you mount the bicycle in driving position.

For that purpose measure (similar to the method described for the suspension fork) the distance between the two suspension element bolts or between rear rack and rear wheel while the bike 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 bike 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 knobby adjustment ring on the threaded part of the suspension element by hand. Turning the adjustment ring clockwise (looking at it from behind) reduces the pre-load, turning it anti-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.

The adjustment ring should be turned no 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 big pre-load of a too soft spring does not take advantage of the full comfort potential.

You will find more information on changing springs in this manual under "Maintenance and Care", page 47.

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

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 it will go (before this, push the possibly existing safety spring ring from its slot in the threaded section as far as it will go). Have a second person mount 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, rear rack or Speedbag is smaller than 1 cm you will have to mount an additional spacer. In case you don't, the mudguard may break suddenly or the rear wheel might be blocked which can lead to serious crashes.



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

Adjusting the suspension

Air shock DT.Swiss XM180

Please follow the instructions in the separate manual from 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 a progressive spring behaviour, whereas steel springs have a 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 have a fitting schrader valve adaptor and a pressure indicator.

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

Recommended pressure settings

<i>load</i>	<i>pressure</i>
- 80 kg (183 lbs)	9 bar
-100 kg (230 lbs)	10,5 bar
-130 kg (286 lbs)	11 bar

Maximum allowed pressure is 18 bar.

Danger! Take care that the rear wheel or mudguard or suspension element never hit the frame, seat or rear rack box while the suspension is fully compressed.

Therefore fully deflate the air shock. Have a second person mount 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 bike 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 through a bad damper setting, especially through unsystematic playing with the knobs that may result in much too high damper 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 GrassHopper 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.



Air Shock DT-Swiss XM180. Damping is adjusted with the red knob at the rear end.

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.

Learning the new riding technique

Learning the new riding technique

Your new bicycle has been assembled by your dealer and adjusted together with you as described on the previous pages under "Adjusting your new bicycle". Before you mount your bike and enjoy your first ride please make yourself familiar with the instructions on the riding technique and the handling.

To ride this recumbent you will have to make yourself acquainted with the different riding position. Make sure that you and all other future users of this 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 pedaling 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.

Danger! With a compact recumbent like the GrassHopper 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 therefore have to apply the following cornering technique: when you ride a curve stretch the leg on the inside of the curve, stop pedaling, only then start steering into the curve. Only when you ride straight ahead again should you resume pedaling. Small riders should shorten the front mudguard to get more clearance.

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.

Protective clothing, clipless pedals, seat

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 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 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 GrassHopper can be upgraded on demand with a binding system. As soon as you are comfortable with riding your GrassHopper 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 pedaling movement where you may even pull a little on the pedals. Without this connection to the pedals your feet may come off suddenly which may result in a fall. Modern system pedals with binding therefore contribute to safe riding.

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

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

Take off 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.

Eventually it may be easier to hold the quick release lever and turn the flat nut on the right side (chainside) of the seat mounts with a 5 mm allen key.

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

Caution! 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.

Strain, riding freehand, way of riding

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 pedaling frequency. Only after having acquired some training do increase the strain slowly.

When you ride on a recumbent you use other 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 have a sporty way of riding it can take up to 6 months until you have become accustomed to your new recumbent.

Should you have pain in your knees while riding this is usually the result of too much power put into pedaling. 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 center. 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 through 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.

Your pedaling cadence should stay between 80-100 revolutions per minute and not fall below 60 revolutions when going uphill. If necessary have your specialist dealer adjust the gear range to your riding style and the terrain you usually ride.

You will find many tips on proper training for cyclists in miscellaneous books and magazines for cyclists.

In case of persistent problems please consult your doctor.

Do not ride freehand

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

How to ride correctly and safely

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

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

way of riding, Quick release levers

Caution! 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. In case you hit such an obstacle frame and fork 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.

Quick release levers

Quick release levers hold wheels and seat in position.

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

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.

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 lie 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: Lift each wheel several inches off the ground and give it a slap onto the tire from above. A properly fixed wheel will remain secure in the frame's dropouts.

The dropouts of the fork of your GrassHopper are designed as safety dropouts. Therefore you always have to loosen the clamping nut of the quick release when you take off the front wheel. When you reassemble it do not forget to tighten the nut again!

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 PITLOCK or KRYPTONITE) that can only be opened with a special tool. For this please consult your local specialist dealer.

Brakes

Brakes

The GrassHopper is equipped with a powerful high-quality brake system. You may choose between rim brakes and disc brakes. Please do 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 exists any legal requirement for the arrangement of the brake levers in your country.

For optimum handling you can adjust the distance between the brake grip and the handlebar with a small hex-headed screw at the grip, please see the respective manual for details.

Note that the front brake is the most effective brake on the GrassHopper. 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. When you brake too much with the front brake the rear wheel may lift off the street and the bike may tumble over.

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 might lead to a serious fall.

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 and this can result in a serious fall!

Danger! In case you get into a situation like that during an emergency stop you have to let go of the brakes immediately, balance your bicycle and brake again. If you are not familiar with the brakes we recommend you to train at first at low speed and with little braking effect until you find the correct dose for an emergency stop.

If you should hear any unusual sounds while braking the braking pads might be worn. Do not use your bike any further until you have checked the braking 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 any more. You can clean oily rims or 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 brake system.

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, do stop immediately and let your brakes cool down.

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

New brake 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 (20mph), which should be done in a safe area without traffic.

Check before every ride:

- that the brake 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 brake 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.

Gear system

Gear system

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

Your pedaling 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 retrofit the gear range to your style of riding.

Your GrassHopper comes standard with a derailleur gear or with a internal hub gear system. The following section refers to the derailleur gear system only. Please 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.

It is not possible to index the left lever so that 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 pedaling.

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

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

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

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

Danger! Do 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.

Light system

Light system

If you want to ride your bike on public streets, it must be equipped with a legal light system. Do not only use your lights in the dark but also in the twilight of dusk and dawn. Due to laws and regulations the brightness of bicycle lights may be considerably lower than that of other vehicles. Therefore always keep in mind that other road-users may only see you very late or not at all.

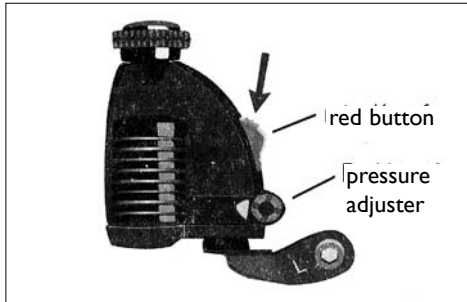
For the GrassHopper, HP VELOTECHNIK offers two different dynamo light systems: one with a tire dynamo and the other with a hub generator.

Both light systems come with strong LEDs for headlamp and rear light. The LEDs last considerably longer (approx. 100.000 working hours) than a light bulb. For your safety the light system has a standlight system 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 light system before every ride.

Tire dynamo

You turn on the light system with the tire dynamo at the rear wheel by unlocking the swivelling dynamo. For this purpose you press the red button at the dynamo until it moves towards the rear wheel. To turn the light off, you turn the dynamo by hand back to its initial position.



You switch on the tire dynamo by pressing the red button. To switch off the dynamo move it away from the wheel.

Danger! Do not try to operate the dynamo lever while riding, your hands could be caught in the wheel and be injured! To turn the light system on or off stop riding, dismount your bicycle and only then do turn the dynamo lever. Turn the lever carefully without applying force else you might bend the lever and damage the plastic parts of the dynamo.

Danger! The dynamo must always be safely fastened to the bracket at the frame, so that it can not turn. If the screws comes loose the dynamo can get caught in the spokes and block the rear wheel - danger of a serious fall! Always check the position and secure attachment of the dynamo before a ride.

You can adjust the pressure of the dynamo against the wheel with the turning knob at the side. The pressure is right when the dynamo wheel just does not slip at the wheel, if the light flickers, the pressure is too low and you have to increase it. The position of the dynamo should be so that the extension of the dynamo axle points through the center of the wheel. Take care that the dynamo is mounted safely and does not turn. Worn dynamo wheels can be exchanged. Please ask your specialist dealer.

Light system, Prop stand

Hub generator

The light system with a hub generator is switched on electrically. For this purpose you will find a switch on the back of the rear light with three labelled switch positions. With the switch you can turn the lighting system ON, OFF or set it to SENSOR. In the SENSOR position a twilight sensor in the lamp turns the lighting system on and off automatically depending on the brightness of the environment.



You switch on the hub generator light system with the integrated switch at the front light.

The SONO hub generator 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 at 15 km/h under 1 Watt).

For details on the hub generator please visit www.nabendynamo.de.

Prop stand

For the GrassHopper you can use a rear prop stand from HP VELOTECHNIK at the rear swing arm.

Caution! To protect the prop stand from turning, it must be mounted with 2 screws to the mounting plate at the rear frame. Do not use standard prop stands with only one screw.

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

Before riding check that the prop stand in any position does not affect the function of other parts.

The prop stand is only suitable for parking the bike on even, solid ground. In case of unsuitable ground, luggage load or mounted fairings we recommend to lean the bike securely against a solid wall or pole.

Folding (GrassHopper fx)

1) Bring right pedal to the front

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

2) Take off 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 (chainside) of the seat mounts by hand or with a 5 mm allen key.

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

Caution! 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.



Bring right pedal to the front and fold handlebars forward

3a) Fold the Above Seat Steering

On bikes with Above Seat Steering, push the handlebar stem forward, thus folding it down to the front end of the bike.

3b) Stow the Under Seat Steering

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

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. 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 and use your other hand to fold the front part of the frame to the right side.

Folding (GrassHopper fx)



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



Folded GrassHopper fx with Above Seat Steering

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. 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.



Folded GrassHopper fx with Under Seat Steering

5) Unfolding

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 14* for proper installation and alignment of the handlebars.

Danger! 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.

Maintenance and care, Brakes

Maintenance and care

Your GrassHopper is fitted 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 you can carry out 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 page 60.

Caution! The maintenance works of 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.

Brakes

The brake pads suffer from wear due to friction and have to be exchanged then. Please read the manual of the brake manufacturer carefully.

With rim brakes the rim walls suffer from wear. When the rims are too worn the tire pressure can tear up the rim and damage the wheel - danger! Please have your bicycle mechanic check your rims at the latest after the second brake pad change and exchange them if necessary.

cable operated (mechanical) brakes

The brake pads of your brakes are worn when you can pull the lever further and further to the handlebar before the pads touch the rim. Rim brakes: When the pads are so worn that you can't see the cross grooves of the pad anymore you will have your bicycle mechanic exchange the brake pads.

To balance the wear of the brake pads you can tighten the cable with the adjuster barrel where the cable goes into the brake lever. First loosen the locknut, then undo the screw so far that the wheel turns, barely not touching the pads, hold the screw and tighten the locknut again towards the brake lever. Take care that the slot of the adjuster points down so that no moisture enters from above or the front.

Caution! Damaged cables with single wires sticking out have to be exchanged immediately. Otherwise your brake system may fail - danger! Please take care that the cable ends are always protected with a cap. Always keep the cables shortly trimmed. Leaving too much cable extending past the cable anchor can result in the cable catching in the rotor or wheel, which could then be pulled in the calliper, causing the wheel to lock up.

Brakes

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

mechanical disc brakes

If the brake pads are worn so far that tightening the cable tension is not sufficient, you can re-align the brake calliper in the slotted holes and adjust the inner brake pad with the hex bolt at the hub side of the brake calliper. Have this adjustment work done by a qualified bike 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 exchanged immediately by a qualified bike mechanic.

Hydraulic brakes

MAGURA hydraulic brakes use low viscosity mineral oil that, contrary to DOT brake liquid used in cars, does not absorb water. Thus, you don't have to change the oil. Please read the MAGURA manual that comes with the bike. You will find more detailed maintenance instructions in the manual "Workshop" that is available for download from MAGURA at www.magura.com. In case of a damaged hose or any leakage of oil always consult a qualified technician in a bike shop.

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

hydraulic rim brakes

To balance the wear of the brake pads there is a turning knob at the brake lever. Turn this knob anti clockwise to move the pads closer to the rim. As soon as the knob doesn't turn anymore the brake pads have to be exchanged. Before you change the pads turn the knob clockwise as far as it will go, back to the initial position.

hydraulic disc brakes

MAGURA disc brakes feature a fully automatic pad wear adjustment. Brake pads are subject to wear, therefore regularly check the thickness of your brake pads and replace them, if necessary. The minimum thickness of the brake pad incl. metal backing is 2.5 mm.

Caution! Never activate the lever blade without the brake pads in place and with the wheel dismounted. When you transport the bicycle without wheels always use the transport clips delivered with your bike or put a piece of cardboard in the brake calliper to replace the disc. Carefully separate brake pads that have moved together with a screwdriver.

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

Gear system

Gear System

Please read the manual of the gear system manufacturer carefully when you want to work on it.

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

Adjusting the gear indexing for the rear derailleur

Adjust the barrel adjuster where the gear cable goes into 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 bike.

When the chain climbs up easily, you need to check that it still goes down easily onto the smallest sprocket. If necessary turn the barrel adjuster 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 the professional cycle mechanic.

Danger! If the bike falls over, the derailleur or its mounting can be bent so that the movement of the derailleur changes. Check the movement 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 bike is often parked outside in bad weather conditions.

Caution! 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

Chain

The chain is a wearing part that has to be lubricated regularly and to be changed at signs of excessive wear and tear.

Lubricating the chain

Diligent lubrication is important. The chain of your GrassHopper is approximately 2.5 times longer than a standard bicycle chain (approximately 3.8 m). But it also lasts longer since a chain only wears while bending at the sprockets and the chain rings.

Use a 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 solely recommends PROFIDRYLUBE. This lubricant is purely based on PTFE (Teflon) that keeps the chain clean and dry. This way dirt simply falls off and the tubes always stay clean. Your dealer can obtain it from HP VELOTECHNIK.

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

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

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

An effective protection against corrosion is critical 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.

Changing the chain

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

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

Only use chains that are suitable for the gear system of your bike. Otherwise a precise gear shifting is not guaranteed any more. Please consult your dealer on this topic. He will also assist you in checking your sprockets and chain rings. A new chain does not fit a worn sprocket or chain ring. We recommend chains from SRAM with smoothly rounded edges. They also shift gears very well.

Caution! When you change the chain take care that the new chain does not show any sharp edges or burrs. Very thin racing chains are also not suitable since they wear the chain tubes and the chain roller much faster.

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 onto the big chain ring in the front and the big rear sprocket. The derailleur must be able to compensate a tightening of the chain by 4 cm. Please see also the manual of the derailleur manufacturer on the choice of the correct chain length.

Caution! 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.

See 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 SRAM (power links). Every time you change the chain you also have to mount a new power 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 through 180 degrees before joining it back together.

Chain Tubes

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 interchangeable retention springs, 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 how many kilometres have been ridden, 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 38.

Caution! 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 drive train it can be blocked and the chain tubes may be destroyed.

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

Caution! 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 guide and thus be damaged by the chain.

Caution! 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 mounts, the chain will touch the retention spring, leading to breakage of the spring and mounts. 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 through expansion. 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 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 cut into the correct length, complete with retention spring from your specialist dealer.

Changing the 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 expand the tube end as described above.

Changing the complete upper chain protection or the retention springs

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

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

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 transparent plastic tube.

Danger! If the bicycle does not stand on the ground while undoing the screws of the suspension element the rear swing arm 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 swing arm comes down in a controlled and gentle fashion by putting up a solid string or cable tie between the main frame and the rear swing arm. When the bicycle is standing on the ground the frame and the swing arm 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.

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 Loctite and tighten the nut with 17–19 Nm.

Changing the lower chain tube

Open the retention clips. On the bottom side of the clip there is a lid that is put over a hook. You can lift up the lid with a screwdriver and expand the clip. Change the lower chain tube and close the clips by fastening the lids over the hooks.

Chain roller

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 no pedaling influences get into the suspension.

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

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

The chain roller wears slowly and gradually shows a sprocket shape in the higher section in the middle. When this middle section 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 chain roller is not symmetrically shaped; the recessed side of the chain roller has to face to the frame, the flat side outwards.

Caution! 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 dismantled the bearings they will be destroyed when you tighten the screw while remounting them.

The bearings must not be treated with a jet of water from a high-pressure cleaner or with solvents since it destroys the seals and removes grease in the bearings. If the bearings don't move smoothly anymore you'll have to replace them.

Dismounting the chain roller

See the notes on changing the chain tubes, page 39.

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

Suspension Fork

Suspension fork

Clean and grease your suspension fork regularly.

Always use a high quality silicone or Teflon lubricant. You can purchase special lubricants for suspension forks at your local specialist dealer.

Clean and lubricate the fork legs every four weeks with a thin film of grease.

If your suspension fork has lubricating nipples at the back you should insert a small amount of grease every four weeks.

After six months at the latest the fork has to be lubricated again. For that purpose open the fork and dismount the parts as described in the following paragraph. If you are in doubt please have your bicycle mechanic do the work.

If your suspension fork comes with a dust boot please clean the lower and upper leg and the seal under the dust boots every four weeks. Otherwise, dirt and water can lead to corrosion.

The following instructions refer to MEKS Carbon suspension forks. For the SPINNER Grind2 fork or other brands please see the instruction manual that comes with the forks.

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 inner fork steerer tube is tightly fitted and glued in the fork crown, never try to tear this connection apart or to change the tube.

Never add threads to the steerer tube - danger of breaking!

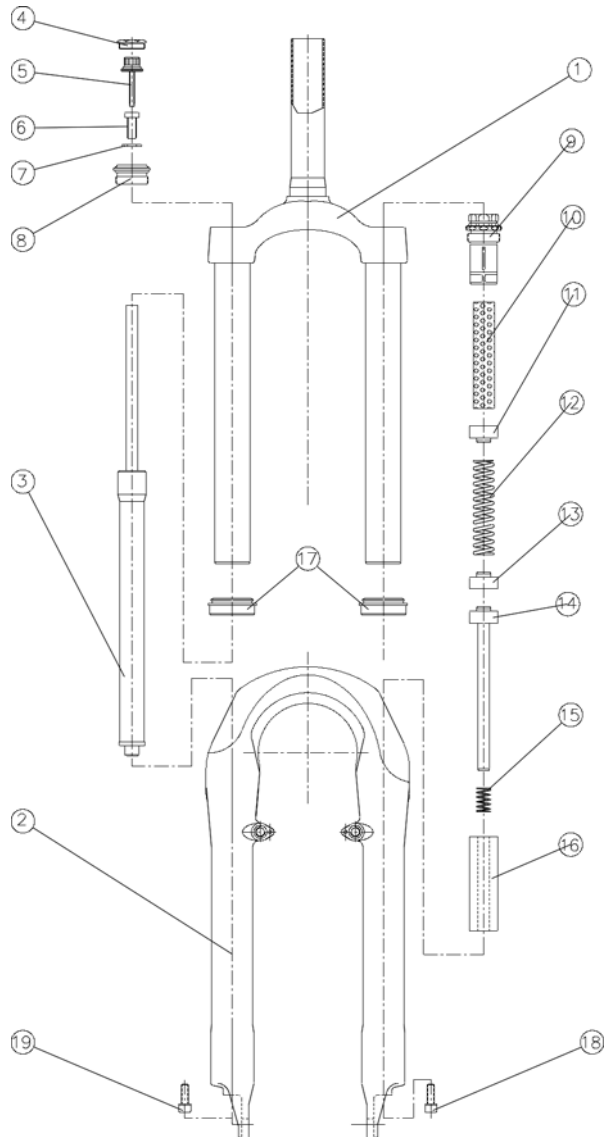
The hydraulic damping cartridge is pressurized and must not be opened. In case of damage the whole cartridge has to be replaced. Caution: After you have removed the adjustment screw (5) you'll see a small hex-headed screw in the piston rod of the damper: never undo this screw. It is under pressure. If this screw is undone too far it can damage the damper.

Before every ride check the suspension fork for signs of damage, deformation or corrosion. If this is the case don't use your bicycle anymore. Ask your local dealer for service.

Suspension Fork

Assembly drawing MEKS suspension forks

Suspension fork MEKS Carbon AC with hydraulic damper cartridge. The version MEKS Carbon All does not have a hydraulic damper cartridge but springs on both sides.



- | No. | Part |
|-----|---|
| 1 | Crown, Stanchion tube and Steerer tube (fixed unit can't be disassembled) |
| 2 | One piece lower leg |
| 3 | Oil damper cartridge |
| 4 | Adjuster cap |
| 5 | Damper Adjuster |
| 6 | Screw M8 |
| 7 | Washer |
| 8 | Damper cap |
| 9 | Preload adjuster |
| 10 | MCU-Elastomer |
| 11 | upper plastic bush |
| 12 | Spring |
| 13 | lower plastic bush |
| 14 | aluminum push rod |
| 15 | Negative spring |
| 16 | Rebound-Elastomer PUB |
| 17 | Dust seal |
| 18 | Screw M6 |
| 19 | Screw M6 |

Exchanging springs

Gently turn the adjustment knob for the pre-load on the adjustment unit (9) clockwise as far as it will go. This causes the spring to relax.



After you have relaxed the pre-load unit of the spring you can turn off the entire unit.

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 anti-clockwise.

Carefully remove the springs with one finger or the head of a spoke from the fork. Alternately 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".

If your spring has an adjustable damping (MEKS Carbon AC) turn the knob clockwise as far as it will go so that the fork does not decompress again.

Undo and remove the screw M6 on the lower part of the leg (18). To prevent the push rod (14) from turning too press the fork together entirely and hold the push-rod with a long Allen key SW5.

At the suspension fork MEKS Carbon All perform the same work on the second spring strut. Now you can pull the upper part of the fork out of the lower part.

At the suspension fork MEKS Carbon AC remove the screw on the lower part of the leg (19). Usually the damping cartridge (3) does not turn. However, when you have difficulties in removing the screw you can fix the cartridge in the upper leg with a screw driver and thus prevent it from turning too. For this purpose, undo the entire damper adjustment unit by placing a wrench on the cap (8). Caution: Never disassemble the adjustment unit (4, 5, 6, 7, 8)!

Clean all parts with a cloth. Grease the bushings, legs, springs and threads thoroughly and assemble the fork again.

Suspension Fork

The bushings, seals and gliding 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 effected 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. 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 or the internal oil can become foamy. This may lead to some noise when the damper is working. This noise does not effect the function of the damper. Only if there is no obvious damping after the first 5 mm of travel, the damper should be replaced.

Rear suspension element

Rear suspension element

Changing the steel spring (DV-22)

You can buy the spring for the rear suspension element in different spring stiffnesses from your dealer.

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

up to 80 kg (183 lbs): 450 lbs./inch
up to 100 kg (230 lbs): 650 lbs./inch
up to 130 kg (286 lbs): 850 lbs./inch

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

In most cases the stiffness is printed onto the spring. Take care to read the imprint carefully, since the term "B650" that sometimes occurs does not 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 swing 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 push it to the front so that you can undo the adjustment ring completely and then turn it to the utmost position at the front. Remove the slotted spring retention disc at the rear end.

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

Danger! If the bicycle does not stand on the ground while undoing the screws of the suspension element the rear swing arm 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 swing arm comes down in a controlled and gentle fashion by putting up a solid string or cable tie between the main frame and the rear swing arm.

Danger! When the bicycle is standing on the ground the frame and the swing arm 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.

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

Remove the spring from the suspension element and put in the exchange spring. Make sure that the new spring has the same diameter and length as the old spring and that it lies safely on the adjustment ring.

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

Rear Suspension Element

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

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

Secure the screws of the suspension element with LOCTITE and tighten the screw with 6-8 Nm.

After having exchanged the spring you have to readjust the spring pre-load as described in the chapter on "Adjusting your new bicycle" on *page 18*.

Cleaning and lubricating

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

From time to time grease the thread for the spring pre-load with a drop of acid-free oil. Thus, you can always turn the adjustment ring easily by hand. Once a year you have to grease the pivots of the suspension element. For that purpose dismount the suspension element as described under "Changing the Spring" on *page 47*.

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.



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

Hydraulic dampers are effected 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. 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 or the internal oil can become foamy. This may lead to some noise when the damper is working. This noise does not effect the function of the damper. Only if there is no obvious damping after the first 5 mm of travel, the damper should be replaced.

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

Swing arm pivot

Swing arm pivot

The rear swing arm pivot comes with maintenance free bushings. They have 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 swing arm please check the two screws that keep the axle in the frame. They have to be secured with LOCTITE.

Tightening torque: 17-19 Nm

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 swing arm 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.

Caution! 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.

The bushings are exchangeable. For that purpose you will have to dismount the rear swing arm and send it together with the axle via your specialist dealer to HP VELOTECHNIK. After having been mounted the bushings are machined to adjust them.

Undoing the axle screws

In order to mount the rear rack or the lowrider the axle screws have to be undone. We recommend you to leave one screw in place to prevent the axle from turning.

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



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

Head set

Adjusting the head set play

The head set 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 with your other hand the upper bearing cup. 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. In that case undo the clamping screw(s) and tighten the screw in the cap a bit more.

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 slightly move the stem upwards by swinging it a little bit.

Above seat steering: After you have 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 8–10 Nm. Check the clamping by trying to turn the stem against the front wheel.

Under seat steering: Tighten the clamping screw M5 SW4 of the headset clamp with 4–6 Nm.

Check whether the handlebars move freely without unnormally touching the frame or the seat.

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.

Seat Cushion

Seat cushion (BodyLink seat)

The standard seat cushion consists of a 1,4 cm thick layer of flexible EVA foam. This is a black 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 that you can dry your seat with a sweep of your hand in case your bicycle has become wet.

Caution! The seat cushion is fastened with Velcro and you can take it off. For this purpose it is important not to simply grab the foam and take it off since the Velcro could come off. In order to take off the seat cushion lift up the upper part a little bit from the seat. Then you grab the cushion on both sides together with the end of the Velcro that sticks out slightly and remove the cushion slowly. In case the Velcro comes off fasten it again with a good glue.

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

For better ventilation, an 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 material at 30° centigrade and it dries very quickly.

The seat cushion suffers from wear through constant use. At the parts that are under punctual strain the mesh can be pressed together permanently. In order to provide a good riding comfort in that situation the airflow cushion has additional rigid mesh padding.

Water bottle Cage, Mudguards

Water bottle cage

You can mount a water bottle cage with a special bracket behind the seat. The derailleur tube at the front of the frame comes with threading inserts M5 for an additional water bottle cage as well.

If your bike is equipped with ErgoMesh seat, you can mount water bottle cages on the seat frame. You will find threaded inserts on the side of the seat frame, covered by the seat net. To access these threads, locate the threads and pierce through the seat net with a hot soldering iron to melt the fabric. Before you do this, make sure the tension of the seat net straps is as desired as no further adjustment will be possible once the water bottle cages are installed.

Another useful alternative to water bottles are systems with a "water bag" and a drinking hose, e.g. from SOURCE or CAMELBAG. You can simply strap them behind the seat, onto the rear rack or into the Speedbag.

Mudguards

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

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

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.

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

Alternatively you can mount the stays at the two outer screws of the U-brace or fasten it with a clip in the middle of the lower leg of the suspension fork.

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

Mudguards, Wheels

Small riders that moved the front boom far inside the main frame will have the bottom bracket positioned closely to the front wheel. These riders can shorten the front mudguard to avoid extensive contact with their feet when taking sharp turns. Please see the notes on safe cornering on *page 24*.

Check whether the suspension can still fully compress with the mounted mudguards. The mudguards, stays and screws (especially at the U-brace of the suspension fork) must not touch other parts under maximum compression.

Wheels

The correct air pressure is decisive for smooth running and a good protection against punctures. The maximum pressure is printed on the side of your tire. Since your GrassHopper is fully suspended you can always go for the maximum pressure. You might find an indication of the minimum required pressure on the side of the tire as well.

Since the tubes in the tires gradually lose 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. For that purpose first undo the valve cap.



Before pumping up the tire, you have to undo the little knurled nut on the valve.

Now you see a small threaded rod with a knurled nut that comes out of the valve. Undo the knurled nut by loosening it as far as it goes.

To pump up the tire and check the pressure you need a pump with a gauge, preferably a solid standing air 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 maximum pressure pull off the pump knob. Secure the valve through turning the knurled nut on the threaded rod as far as it will go towards the valve. 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.

Wheels, Cleaning and conservation

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.

When you exchange tires please note the maximum width limit of 50 mm (approximately 2 "). We recommend tires that are 32-40 mm wide. At both wheels you have to use tires of ISO size 406 (20"). The tire width possible at your bicycle depends on the size of your rims. Please ask your local dealer.

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

The spokes of the wheels connect the rim with the hub. They transmit the braking power of the disc brakes, and in addition they transmit the pedal forces at the rear wheel.

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!

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

The wheels are fastened with a quick release lever and therefore they are susceptible to theft. For this reason always lock the wheels along with the frame to a solid object when you park your bicycle somewhere. It is also possible to exchange the quick release axles with axles that have special security locks (e.g. PITLOCK or KRYPTONITE) that can only be opened with a special tool.

Cleaning and conservation

The frame of the GrassHopper has a high quality and environmentally friendly powder coating. The surfaces of the aluminum 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 affect the parts, and not only may this cause flaws but also serious structural damage of the parts through corrosion.

In contrast to a widespread belief particularly the "non-rusting" aluminum 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.

Do 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 special cleansing agent for bicycles in addition.

Caution! 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.

Caution! 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.

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.

Caution! 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 you have cleaned 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 38.

The frame has small holes for ventilation that prevent condensation in the frame. These drilling holes must not be sealed. However, moisture may enter the frame through the drilling 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 with a layer of tape. You can buy extra strong transparent tape at your do-it-yourself-store. That way you avoid scratches in the powder coating and coating coming off.

Storing the bicycle, Screws and bolts

Storing the bicycle

Before storing your bicycle over a longer period of time, e.g. over winter, please take care of the following steps:

- Clean your bicycle and protect it from corrosion as described in the chapter on "Cleaning".
- Store your bicycle in a dry and warm place.
- Avoid direct sun and storage close to the heating since it affects the rubber of your tires.
- Choose the smallest sprocket and the smallest chain ring. That way the cables are in the most relaxed position.
- The tubes of your tires lose air when standing over a longer period of time. If the bicycle then rests on flat tires the tires may be damaged. Therefore hang up your bicycle or check the air pressure regularly.

The winter months are a convenient period of time for the annual service since then you won't have to wait long for an appointment. Many dealers offer special prices for the winter check.

Screws and Bolts

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

In the following table you will find the prescribed tightening torques, they refer to greased screws!

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

Do use high quality acid free grease, if possible a lubricant with added solid particles like Teflon or MoS₂. Their ingredients still work properly after the thinner grease has been removed from the contact points.

Alternatively you can use LOCTITE screw securing fluid 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 do only use screws of the same type. Screws come in different strength classes. Please do only use galvanised screws of the same type and strength, corresponding to the German strength classes 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.

Tightening torques for screws

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	screw	tightening torque
V-brake:			
-brake lever	handlebar/grip	M6 SW5	4 Nm
-brake calliper	calliper/frame	M6	8–10 Nm
	cable clamping		7–9 Nm
disc brake:			
-brake lever	handlebar/grip clamping	M6 SW5	4 Nm
-brake lever	compensation tank	Torx T7	0,6 Nm
-brake calliper	calliper/frame	M6 SW5	6 Nm
-brake disc	disk/hub	M4 Torx T25	4 Nm
-brake housing	brake lever	SW8	4 Nm
dynamo	dynamo/adaptor	M6 SW5	6–8 Nm
	adaptor/frame	M5 SW4	4–6 Nm
suspension element	element/frame	M6	6–8 Nm
rear rack	at the seat tube	M6 SW5	8–10 Nm
rear swing arm	axle/frame	M8	17–19 Nm
b.b. set	cartridge/frame		50–60 Nm
chain roller	roller/frame	M8 SW 6	17–19 Nm
crank	crank/axle		35 Nm
	chain ring screws		8–11 Nm
hub	cassette ring		38–42 Nm
quick release	wheel/frame		9–12 Nm
pedal	pedal/crank	SW15	35–40 Nm
shifter lever	lever/adaptor		2,5–3 Nm
	adaptor/handlebar	SW6	5–6 Nm
derailleur	derailleur/frame	SW6	8–10 Nm
	cable clamping		4–6 Nm
mudguard	stay/frame	M5 SW4	4–6 Nm
seat	upper seat part / seat mt	M6 SW4	5–6 Nm
	lower seat part / frame	M6 SW4	3–4 Nm
frame	front boom clamping	M8 SW6	14–16 Nm
front derailleur	front derailleur/frame	M5 SW5	5–6 Nm
	cable clamping	M5 SW5	4–6 Nm
USS stem	length adjustment	M6 SW5	8–10 Nm
	main Axle / bearings		17–19 Nm
	adaptor / steerer tube	M8 SW6	30–32 Nm
	headset clamp	M5 SW4	4–6 Nm
	steering rod / mounts	M6	8–10 Nm
ASS stem	stem / fork steerer tube	M6 SW5	8–10 Nm
	height adjustment	M5 SW4	4–6 Nm

Warranty

Warranty

Your authorised dealer has to fully set up and adjust your bicycle, so that safe function is guaranteed. The dealer has to make a final safety check and carry out a test ride.

Your cycle dealer is obliged by law to ensure, among other things, that your bicycle is not affected by defects which materially diminish its value of suitability for the described purpose. The exact details will vary according to the country. In Germany, this liability ends two years after purchase.

In addition to this HP VELOTECHNIK offers a 10 year warranty (max. 30 000 km) on the frame of the GrassHopper against damage through material or manufacturing defects. This warranty applies only to the original purchaser.

Damage through wear and tear, corrosion or damage at the surface coating is excluded.

Damage through inappropriate use, inadequate care and maintenance, falls, crashes, overloading through excess weight, incorrect assembly or modifications to the bike is also not covered. The onus rests with the purchaser. The warranty is void if any of the instructions in this manual are neglected.

The warranty starts with the date of purchase (receipt of the bike dealer) of a new bicycle. The warranty is processed via the bike 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 case of warranty we will replace or repair the damaged part with a part of our choice or a new part equal to the old one (warranty obligation). We do not cover any transport, labour or any secondary costs.

In the event of any action that falls under warranty the original warranty period will not be prolonged and no new warranty will be given. If HP VELOTECHNIK refuses to count a repair as warranty case we will only carry out a repair with costs after having talked to the customer or his representative, the respective dealer.

It is necessary for the purchaser to fill in the enclosed warranty registration form to benefit from the extended warranty. This filled in form has to be sent to HP VELOTECHNIK within 4 weeks after the purchase.

The warranty is only valid when the warranty pass at the end of this manual has been filled in when you received your bike 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

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 next page 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.

Warranty Pass

Service Plan	
part	work
light 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 dust boot and correct position lubricate check fork play, adjust if necessary replace worn out parts / hydraulic cartridge
rear swing arm	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 adaptor and linkage rod for proper mount
headset	check bearings, grease

see page	before every ride	monthly	annually	note
31	• •		•	
53	•	•		
29 / 35	• • •	•		
47		•	• ▲	
43		• ▲ •	▲	every 6 months
49			▲	
			▲	
53			▲	
38		•		
40		•	▲	
42		•		
			▲	
54		•		
53		•		
13			▲	replace aluminium bars every 2 years
13	•			
14			▲	

Warranty Pass

Service plan (continued)	
parts	work
hubs	check bearing play and brake discs mount
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

This service plan 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.

see page	before every ride	monthly	annually	note
			▲	
			▲	
7 54	●	● ●		
27	●			
37	●	●		
56		●		
53		●		
53	●			
13	●		▲	
37			▲	

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 other dirty factors it is necessary to have shorter maintenance intervals.

In order to measure your riding performance we recommend you 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 GrassHopper one day.

Warranty Pass

Your personal Warranty Pass

name:

address:

telephone:

frame no:
(stamped into gusset of the main frame)

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 deraillieur 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:

Dealer's Signature and Stamp:

service at delivery

At the delivery of a new GrassHopper

Order No.:

milage approx. km:

Date:

Dealer's Stamp and Signature:

Exchanged or additionally mounted parts:

(When you assemble a frame kit please list the components on an extra sheet and attach it to this Warranty Pass.)

1st service

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

Order No.:

milage approx. km:

Date:

Dealer's Stamp and Signature:

Exchanged or additionally mounted parts:

2nd service

No later than 3000 kilometers or one year after the purchase.

Order No.:

milage approx. km:

Date:

Dealer's Stamp and Signature:

Exchanged or additionally mounted parts:

Warranty Pass

3rd service

No later than 6000 kilometers or two years after the purchase.

Order No.:

milage approx. km:

Date:

Dealer's Stamp and Signature:

Exchanged or additionally mounted parts:

4th service

No later than 9000 kilometers or three years after the purchase.

Order No.:

milage approx. km:

Date:

Dealer's Stamp and Signature:

Exchanged or additionally mounted parts:

5th service

No later than 12000 kilometers or four years after the purchase.

Order No.:

milage approx. km:

Date:

Dealer's Stamp and Signature:

Exchanged or additionally mounted parts:

6th service

No later than 15000 kilometers or five years after the purchase.

Order No.:

milage approx. km:

Date:

Dealer's Stamp and Signature:

Exchanged or additionally mounted parts:

Warranty Pass

11th service

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

Order No.:

milage approx. km:

Date:

Dealer's Stamp and Signature:

Exchanged or additionally mounted parts:

12th service

No later than 33000 kilometers or eleven years after the purchase.

Order No.:

milage approx. km:

Date:

Dealer's Stamp and Signature:

Exchanged or additionally mounted parts:

13th service

No later than 36000 kilometers or twelve years after the purchase.

Order No.:

milage approx. km:

Date:

Dealer's Stamp and Signature:

Exchanged or additionally mounted parts:

14th service

No later than 39000 kilometers or thirteen years after the purchase.

Order No.:

milage approx. km:

Date:

Dealer's Stamp and Signature:

Exchanged or additionally mounted parts:

NEW
recumbent-
technology



HP08
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