

Quest User Guide

1. Introduction

This manual tries to provide insight into the functioning of your bike. As you spend time in it, you can assess its mechanical condition and can recognize when your bike needs maintenance. This will be rewarded by many carefree and enjoyable kilometers.

2. Operation Tips

The Quest has a number of special properties. Give yourself some time to get used to it.

2.1 Driving

- Controls for steering and brakes are different from a typical bicycle
- A tricycle has a very different behavior in turns than a bicycle. Taking turns too quickly can raise the inside wheel. Start gently as you learn the Quest's handling characteristics.
- You can easily reach higher speeds. Higher speeds require longer stopping distances.
- The Quest has limited ground clearance. Look out for large speed bumps and changes in pavement level that are not parallel to your line of travel.
- The brakes on the Quest are Sturmey Archer drum brakes. On longer mountain descents the drums may overheat if engaged for long periods. Stop if you smell the brakes overheating or if performance decreases and allow some time for the brakes to cool. Remove the front wheel covers if you intend to ride in areas with longer descents, as the brakes cool better without them.
- Before each ride check the tires for wear and deformation. A tire blowout can cause a loss of control.
- A Quest has a derailleur drive system. You can only shift if you are pedaling forward. If force is applied to the pedals when the derailleur has the chain out of position (if for example you shifted with bike at a standstill) you can cause damage to the shifting mechanism. Stop if you hear the chain making sounds when reversing

2.2 Traffic

- Be courteous in traffic: a velomobile is a relatively new and striking phenomenon on the street. Your behavior in traffic will be critically assessed.
- Others will often underestimate your speed. Many will assume the Quest is a larger vehicle and think it is further away that it really is.
- In some circumstances, a low bike is less visible. Parked cars, fences or hedges can hide you from other vehicles. Keep this in mind, even if you have the right of way.

2.3 Use

- The Quest is built as light as possible. The body is strong enough to absorb the forces that occur during driving, but can be damaged by improper use.
- Park your bike in a sheltered place during strong winds, especially in the vicinity of buildings where sometimes stronger winds can occur. In extreme cases, the bike can be overturned.
- You can use a cable or bracket type lock to secure the Quest by passing it through the wheel. Remove the wheel cover or make a hole in it. At night, your bike is best protected against risks in the garage at home.
- To estimate the value of your bike for insurance purposes, be sure to take into account its contents (computers, GPS etc.), this usually adds little extra cost to your premium.

3. Special

3.1 Entry and exit



Easy entry and exit of the Quest requires some skill and practice. Please note:

- Hook the tiller behind the lid edge, so that it isn't in the way.
- You can only stand on the crossbar between the wheel and the seat, NOT on the floor.
- You can use your hands to support yourself on the sides of the lid edge.
- You can sit on the back edge of the lid.
- Never sit or lean on other parts of the bike.

3.2 Clipless Pedals

The bike is equipped with SPD "clipless" pedals. This system requires special cycling shoes with bolt on cleats. The correct position of these cleats is important, read the instructions supplied by the manufacturer. Tall people that have issues with limited foot space, can move the cleats to the outside and the front of the shoe to gain more clearance.

The SPD (or similar) system is strongly recommended for this bike. The ride is more relaxing if you're not constantly using your leg strength to keep your feet in position on the pedals. When clipped in you can more efficiently transfer your power. In addition, your feet can not slip off the pedals, striking the vehicle's body and resulting in damage and / or injury.

3.3 Luggage

The Quest has storage space next to the seat. The storage space in the back of the bike is easily accessible by folding the seat. Avoid placing heavy things on the chain and sprocket guards or behind the wheel. Pack compact heavier stuff, right behind the front wheel next to you, so the bike remains stable in the sharp curves. Placing luggage high or further back, decreases the stability of the bike in turns.

4. Personalized setup of the bike

It is important for your comfort that your Quest be properly adjusted. An improper positioning of the bottom bracket gives a poor return on your effort and can lead to injuries.

4.1 Seating

The seating position of the Quest is adjustable and should be optimized to give you the best comfort and performance. Follow these guidelines.

Height. You should be high enough in the seat that you have good visibility but your shoulders should be below the edge of the cockpit opening. The lower the seat, the lower the center of gravity. A lower center of gravity will add stability in turns. Also, raising the seat may decrease knee clearance with the top of the body.

Recline. The recline angle of the seat can also be changed. As you recline the seat, you change the part of your body that is supported, away from you gluteus and more towards your back.

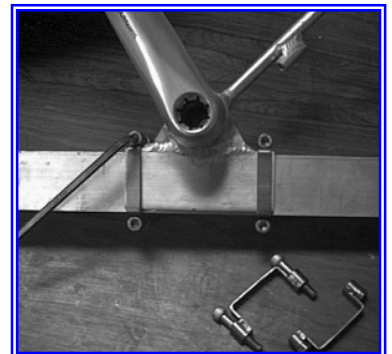
For a stable seating position, the space between the shoulders and the bike is filled with foam shoulder supports.

4.2 Setup; leg extension and pedals

The leg extension is adjusted by moving the bottom bracket. A rule of thumb for this distance is: with the pedal in the distal position (furthest away from the seat), the heel of your shoe should just be able to just touch the pedal. Depending on personal preference, this can be varied somewhat. If the pedals are too far away from you, it can cause an Achilles tendon injury, pedals too close can cause knee injury.

4.3 Adjusting bottom bracket

It is useful to mark the original position of the bottom bracket on the frame with a marker before making an adjustment. This allows you to see how far you have moved the bottom bracket. If the bottom bracket is moved more than a few centimeters, the chain length will need to be adjusted. Please note that the chain length will change twice as much as the amount the bottom bracket is moved. The bottom bracket is adjustable via the foot holes, to make this easier, lay the bike on its side using a blanket to protect the finish.



1. Loosen the 4 bolts (5 mm) that hold the clamp brackets.
2. Slide the clamp brackets off the bottom bracket holder
3. Lift the bottom bracket holder off the frame
4. Move the bottom bracket to the desired position
5. Press the bottom bracket holder on the frame again
6. Slide the clamp brackets back on the holder
7. Tighten the clamp brackets bolts (top and bottom) in order and not too tightly

Note: If the bottom bracket is being moved forward check your chain length. You must be certain that the chain is not too short as this will damage the rear derailleur.

5. Operation

5.1 Tiller

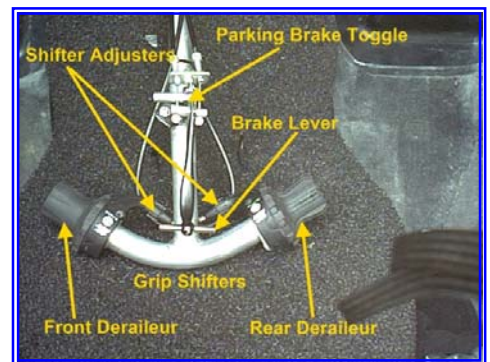
The Quest is steered with a tiller. It can be moved up and down without affecting the steering. You can hold the tiller in a position that you find pleasant.

5.2 Brakes and Parking

In the center of the tiller there is a lever for the brakes. It has a blocking device which serves as a parking brake. To set the parking brake, squeeze the brake lever and lift the aluminum toggle to hold the brakes. To release, squeeze the brake lever until the toggle moves out of position.

5.3 Gears

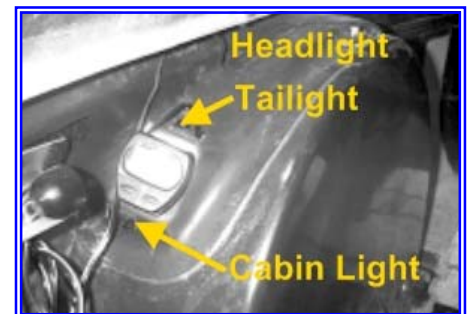
At the end of the tiller handles, are grips which are rotated to change gears. They have indexing positions, the left one has fine clicks for the front derailleur and the right handle has 9 clicks for the rear derailleur. With a derailleur, gears can only be changed while pedaling. Relax the pressure on the pedals as you turn the gripshifters. If the Derailleurs do not respond, refer to the instructions supplied by the manufacturer.



5.4 Lighting

The Quest has battery lighting with halogen headlights and LED taillight. It also has a cabin / breakdown light installed.

A battery in good condition will give a standard headlight about 6 hours of power. The Quest also has a cabin light. This will allow you to see inside your bike in the dark. The cabin light has a long cord and is removable so that it can be used to aid in changing a tire in the dark. The LED bulb has a very long life, but can not be replaced separately.



5.5 Bell

The bell mounted in the front of the bike and is operated by a pull cord. The Quest is equipped with a standard bicycle bell so others will quickly recognize you as a cyclist (a battery operated

electric horn is optional).

5.6 Cycle Computer

Refer to the cycle computer's factory (OEM) manual for setup instructions. Front wheel circumference is set for the stock tires. If you use different tires, you can determine the circumference of the tire by rolling it along the ground, marking one full turn and measuring that distance in millimeters. That is the number you input. The magnet for the computer sits in the left front wheel, the sensor is on the left strut (spring leg).

5.7 Foam Cover

The Quest has a lid made of thermo-formed foam. When the weather is nice it can be driven without the cover. The lid can be folded and then stored inside the bike. Do not leave the lid folded or rolled up for a long time as it could be permanently deformed. It is better to place the lid in the back of the bike when you take it with you.

The lid has 5 Velcro tape straps attached to the bike. In strong winds it is recommended to secure all five. When used in the city, secure only the 2 side straps so that you may release the lid and stick your hand out to signal.

If you park your bike you can leave the cover loose over the cockpit entrance.

6. Driving in the Quest

Because the Quest behaves quite differently from the standard bicycle that most cyclists are accustomed to, we recommend you take the time to relax and explore the riding characteristics of the bike.

The Quest has a fast aerodynamic shape. Depending on the wind, you will be around 25% faster than a road bike. If you stop pedaling, the Quest will coast a long distance. Accelerating takes more energy. An "efficient" driver adjusts his or her driving accordingly, seeking the ideal line in a turn. Naturally you need to be careful when taking turns so that you can still see the road ahead of you.

The energy necessary for acceleration is directly proportional to weight. The Quest is about twice as heavy as a sport bike with a rack and lights. However, this does not mean that you need twice as much energy to reach a certain speed, you must consider the total weight of bike and rider together. In a Quest, a rider weighing 80 kg would only weigh 16% more than the same rider on a sport bike. As the speed increases the Quest benefits from its aerodynamic shape and has the advantage of lower air resistance. At speeds above 30 kmh (18.75 mph) you can accelerate faster than a road bike.

6.1 Place in traffic

In most locations a Quest is considered a bicycle and is subject to the same road rules as a bicycle. Being a tricycle, the Quest requires some special considerations. It is only 76 cm (30") wide at the wheels (track) so will therefore usually fit most bike path and cycle lanes.

It is your responsibility to consult the laws for your locality and to be sure you comply with all local, state and federal regulations.

6.2 Special precautions

Winter Time: Although a trike is potentially safer on icy roads than a two wheeled bicycle, there are still dangers. If you slide sideways from an icy patch to a dry part of the road, it is possible to flip over.

Winds: Strong winds will affect your Quest. Side winds can actually have a sail like effect and propel you along making cycling easier. But strong winds can be dangerous, particularly as you turn into the wind, so exercise caution.

7. Safety

7.1 Visibility

Quest drivers in traffic often get the criticism that they are hard to see. We believe that someone who doesn't see a brightly colored object nearly 3 meters long, is just not looking. Such observations are aside from the fact that the Quest is an unknown phenomenon and will attract attention. However, in some situations you can actually be less visible. If you appear from behind (parked) cars, bushes or fences, people may not see you. Another danger is that people may misjudge your speed. It is a good idea to keep this in mind as you encounter certain situations: Even if you have the right of way, if you have an accident you still lose. Pay attention to whether others see you and make eye contact with your fellow road users.

7.2 Visibility in the dark

Test the lights and the condition of the battery. Adjust your speed to match visibility.

7.3 Helmet

Always wear a helmet while cycling. Choose an approved model. A helmet with a flat back will be more compatible with the headrest. In certain driving conditions you may find a visor to be a desirable feature. Some find a helmet mounted mirror useful.

8. Maintenance

Work on key components such as suspension, steering, brakes and drive should be carried out with good engineering practices. Improper repairs affect your safety. We recommend that you have your bike inspected by a bike mechanic familiar with recumbent trikes every 10,000 km. If one is not available then Rainshadow Velo would be happy to assist a local bike shop with a bike check-up.

8.1 Tires

Keep the tires properly inflated. The tire manufacturer provides pressure information on the

sidewall of the tire. Proper inflation will give lower tire rolling resistance and better handling. The correct pressure of the tires is the best achieved using a manual pump with pressure gauge. Also occasionally remove any bits of glass or stones that may have become embedded in the tires as these can cause flat tires.

The front wheels on the Quest are cambered for improved handling and will wear the tires slightly off center. Rotating the tires every 1,500 kilometers will increase their service life.

8.2 Punctures

Tires are a compromise between low rolling resistance, weight, durability and puncture resistance. Because your physical power is limited, a compromise has to be made, sacrificing durability for lower weight and reduced rolling resistance.

The wheels on the Quest are attached to the suspension on only one side. This allows the tires to be changed without dismounting the wheels. You can support the bike on the tip of your toe to lift the wheel of the ground. You can also gently lay the bike on its side on grass or on a blanket (see photo).

Be sure to find the cause of the flat tire (small rock in the tire, rim tape lying askew, thorn) or else it will cause another flat.

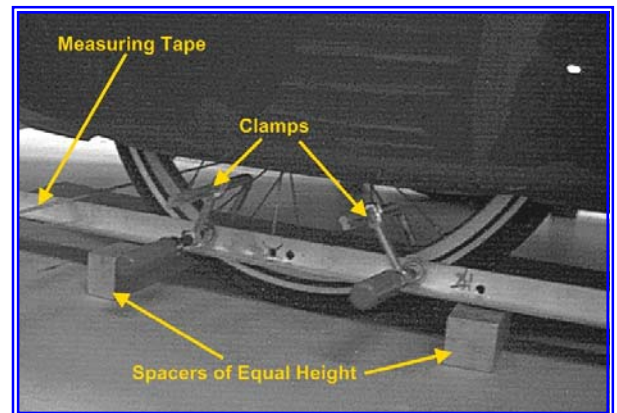


It is recommended (especially in the dark and / or rain) that you replace both the tire and the inner tube. Once home you can comfortably check and repair the punctured tube and inspect the tire.

8.3 Tire Wear / front wheel alignment

Tire life is highly dependent on your driving style and the type of surface that you ride on. Quick or aggressive turns will increase tire wear, but so will driving daily on a winding path. Some users report from 4000 to 8000 km for the front tires and twice as much for the rear.

The alignment of the wheels is very important for the life of the tires and the performance of the bike. The front wheels should be run exactly parallel. Measuring the toe-in accurately should be done on a flat surface.



To determine alignment:

- Set the wheels in the straight position.
- Use clamps to attach strips or slats tightly against the rim, just let some air out of tires. It is important that these slats be completely straight.
- Measure the distance between the slats, in front of and behind the wheels.

If the distance between the slats (measured just in front of and just behind the wheel) is more than 3 mm, should you adjust toe-in. Follow this procedure:

- Clamp the steering rod with a pair of pliers and loosen the locknut on the steering rod.
- Loosen the retaining nut on the balljoint to remove it from the steering mechanism. The balljoint has some flats right underneath the ball for a wrench. Use a thin wrench to keep the ball from turning while you loosen the retaining nut.
- Pull the balljoint loose from the steering mechanism
- Turn the balljoint in or out in the required direction to make the rod shorter or longer.
- Reassemble without tightening the nuts and measure again
- If the alignment is correct, tighten the locknut and the retaining nut.

8.4 Spokes

During fast turns the wheels are subjected to large lateral forces. Occasionally spokes may break. Check your wheels for broken spokes. Quest wheels have 36 spokes.

- spoke length front wheels: 180 mm
- spoke length rear: 264 mm

If you replace a spoke make sure it is as tight as the other spokes. All spokes should be tight and have even tension. Loose spokes can move while driving and will soon break due to metal fatigue.

Wheel truing requires some experience. Using a wheel building stand with Quest wheels will require an adapter because they are designed for wheels supported on both sides. These adapters are available from your dealer.

To replace a spoke, the wheel should be dismantled.

8.5 Dismounting a Front Wheel

The front wheel and front suspension can be removed together. From inside the cockpit, remove the 13mm nut (on top of the wheel box) that holds the strut. Lay the bike on its side and remove the nuts that hold the lower ball joints. Separate the ball joints from the suspension member (this may require some force). The left wheel strut has the computer sensor mounted on it, take care not to damage it or its wire. If you loosen the computer holder (inside the cabin) and move it towards the hole where the sensor lead (wire) goes through the wheel box, it will give you enough room to move the strut/wheel assembly so that you can remove the wheel from its axel.

8.6 Dismounting the Rear Wheel

The rear wheel bearings are in the swingarm. A 15mm axle runs through the swing arm and has the cassette and the wheel mounted on it. They are retained by a 6 mm bolt and double M 8 nuts. The puller needed for disassembly comes with a new bike and is included in the shipping crate. A replacement can be obtained on request.



Shift the chain onto the smallest sprocket. Take off the cover on the right side of the bike by removing the bolt using a 3mm Allen key.



On the left side of the bike, remove the M6 axle retainer bolt on the hub using a 13mm wrench.



Remove the wing nut on top of the rear suspension arm. The swingarm and rear wheel can now drop down for access.



Remove the bolts and the ring in the end of the axel.



Thread the puller into the end of the axel.



Pull the axel out of the hub and bearings by turning the nut on the puller.



With the axel halfway out, you can remove the wheel in a downwards direction. If you pull it out further, the cassette can also be removed.

Remove the derailleur and take off the bolts that connect the swingarm to the bike.



Reassemble in the reverse order. Tighten the two M8 bolts against each other to lock them. Turn the wheel on the axle using the 6 mm bolts.

8.7 Lighting

When not being used the headlight is retractable (for better aerodynamics) by using the lever inside the cabin. You can access the headlamp for maintenance through the foot holes when the bike is on its side.

The Quest has a NiMh battery. It may be recharged from any state of charge and does not need to

be fully discharged first.

- Never put the battery away for an extended period of time in a discharged condition, this shortens its life span.
- A red light will be on if the charger is charging, the charging time for a discharged battery is approximately 6 hours.
- The charger may be left connected to the battery for an unlimited time, it automatically switches off when the battery is fully charged.
- If there is a short circuit in the wiring, the fuse will blow. Do not bypass the fuse without first fixing the short, as even a small battery can cause a fire.

8.8 Chain / derailleurs

The chain should be lubricated occasionally. This is best done with the thin oil that is supplied with the bike.

Over time, the shifter cable may stretch a little and the shifting of the rear derailleur can become inaccurate. To compensate for this, turn the adjuster screws where the cable comes out of the gripshifters. You can do this while you ride the bike so that you can check the impact immediately. Of course be very alert of traffic.

8.9 Brakes

It is important to check your brakes before every ride. You can adjust the brakes by turning the adjusters in the brake levers. To check the brake after tightening the cable you can lift the bike on its side and turn the wheel by hand. A quick way to make sure that both brakes adjusted equally, is to set the parking brake and lift the rear of the bike. Swinging the rear left or right should take the same effort.

8.10 Steering play

Over time, play may develop in the plastic block for the universal-joint at the bottom of the steering mechanism. This can be remedied by adjusting the two bolts that go through it. Adjust one first then the other keeping in mind that each acts in a different axis. Note: The steering must be free to move, otherwise the lower terminals of the block may cause unwanted steering reactions.

8. Contact Information

For questions, comments, components and maintenance, please contact:

Rainshadow Velo
PO Box 541
Orcas, WA 98280
USA
info@rainshadowvelo.com