RECUMBENT INSTALLATION INSTRUCTIONS FOR Q-RINGS

(Rev. 26.Mar.2007) Please check for updates on **Rotor's official website,** ***www.rotorbike.com*** Before starting!
Please discard all manuals available from any other source than rotorbike.com or the product box!

Recumbent Q-Ring setup is different to setup on upright bikes, so please ignore the diamond frame instructions. If you are not planning on reading and following this manual, we very strongly advise you let the bike store that sold you these chainrings install them instead.

The dimpled markings above 5 of the OCP holes cannot be used to setup your Q-Rings in regard to the crank on a recumbent. However, regulation point 1 is used as an indicator to find the Q-Rings' orientation four your bike. Please read this manual and understand completely before starting, and read each point through before undertaking any action. The manual has been split up into 4 necessary chapters to help understand the process of installing your Q-Rings perfectly.

Do not to copy anybody else's setup blindly because the chain routing that defines the Q-Ring orientation and the angle of the crank at the dead spot varies both per cyclist and per bike. The point where the chain makes first contact with the Q-Ring *when your crank is at your dead point on your bike* defines the setup.

Important note to bike shops*: Be certain to complete section 1 when the customer gives you the bike and fix the cranks in the position found, to install these Q-Rings properly!*

Materials Required:

- 1x fine tipped permanent marker,
- 1x thin ballpoint pen or pencil,
- 1x 5 mm Allen key (you may also need a 4mm Allen key, or even a or a torx key, if you have non conventional chainring bolts)
- You may need the tools required to remove your crank as well.

Section 1: Finding your Dead spot.

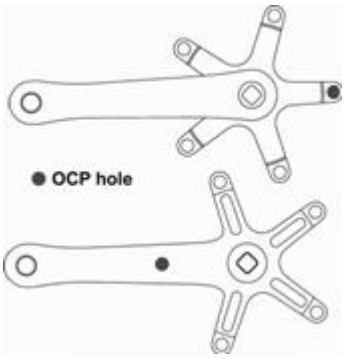
In this section we will find your "dead spot" and prepare your crank for the Q-Rings.

1. Before installing the Q-Rings onto your cranks, place your cranks in the direction of the right side "lower" dead-spot (LDS) for your particular frame design. The right side LDS is defined as the ***"position the crank is at when the cyclist's right leg is at maximum extension".*** To find your Right hand LDS get on your bike, put both your feet on the pedals and push the right pedal forcefully. *Both feet must be on the pedals or your back will arch which may cause error! L*et your bike roll until your leg stops moving. Where your leg stopped and you have found your LDS. Your LDS will be different to anyone else's, so be sure to do this yourself. (See the last page for examples of the approximate position of the dead spot. Do not install your Q-Rings by eyeballing the setup in the pictures!)

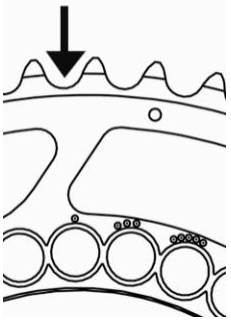
2. Get off your bike and take note of the exact angle your crank is at. Remove your circular chainrings using a 5mm Allen key (or alternative tool, as described above). Make sure that the Right crank is still at the LDS after you have removed the chainrings. You are now ready to start installing your Q-Rings.

Section 2: Finding the orientation of your Q-Rings

In this section we will define exactly what the orientation of your outer Q-Ring should be - primarily in regards to your chain line, and secondarily in regards to your crankset when it is at it's right side LDS.



3. You will notice that one of the five spider arms is in line with the crank arm, and the bolt hole of this spider arm is opposite the pedal-hole of the crank. We call this hole the **"ocp hole"**. If there is no spider arm in line with the crank, the bolt hole behind the crank arm is the "**ocp hole**". On triple cranks, the inner chainrings ocp hole is directly inside the outer ring ocp hole. This point is used to install, mark and regulate your Q-Rings.

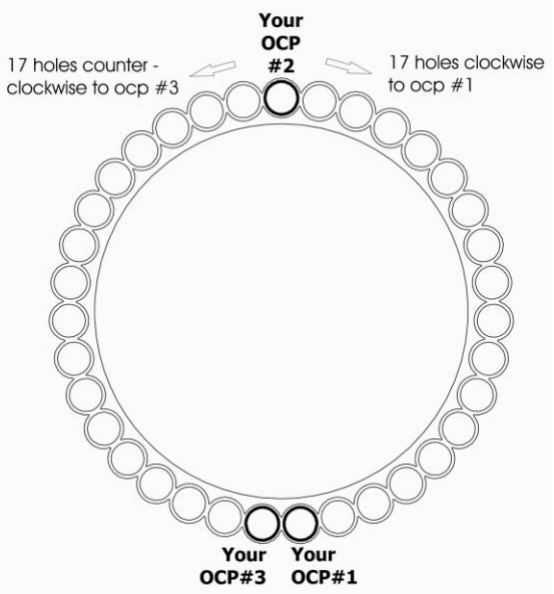


4. While the cranks are held at your right LDS, place the large Q-Ring onto the spider and put the chain on the Q-Ring, so that the first tooth-trough that fully engages the roller of the chain at the top of the Q-Ring (the side that pulls the chain) is directly above the Diamond frame regulation point #1. Now mark the hole currently at your **"ocp hole"** with a permanent marker as regulation point #2.

Section 3: Marking your OCP points 1 and 3.

In this section we will mark your OCP positions #1and #3 on both your inner and outer Q-Ring. (And to the inner if you have a RD3 set)

5. Put your outer Q-Ring back on a table, with both the laser etched logos and the countersunk OCP holes facing up, and find your permanent marker.



6. You will see that the Q-Ring has a ring of 35 holes on it's inside perimeter. Count 17 holes clockwise from regulation point #2. This hole will be almost opposite hole #2 in the OCP ring. Mark this hole as regulation point #1 with your permanent marker. Now mark the very next hole in a clockwise direction as #3.

7. Now note the position of your personal OCP #1 (which you just marked) to the dimpled diamond frame OCP reference #1. Take the inner Q-Ring (if you have a double set, take the middle Q-Ring) and place it on the table so you see the side without countersunk OCP bolt holes. Using the diamond frame dimples as a reference, copy your personal OCP settings over to the inner (middle for triple) chainring. If you have a triple set, the smallest chainring doesn't have the same amount of holes as the outer ring. Put the inner Q-Ring on top of the middle Q-Ring, aligning the two ovoid shapes exactly, with both chainrings placed so that the countersunk bolt holes are upwards. Now eyeball the 3 best closest settings to your middle rings settings and mark these. If you can't choose between two holes, take the one which is furthest from diamond frame OCP point 1 in a counter-clockwise direction – *even if this means it is closer to point 1 in a clockwise direction!*

Section 4: Finalizing your installation.

In this section we will install your Q-Rings and adjust the derailleur.

8. Place the Q-Rings onto your cranks aligning each chainrings' #2 OCP point with the OCP hole on your crank. (You may need to remove the crank to get the inner Q-Ring(s) onto the crank.) Make sure that the middle and inner Q-Rings, have the countersunk fastening holes facing the frame so the bolt sinks into the chainring when you tighten it. Grease then install all chainring nut and bolt sets by hand, making them finger tight. Now tighten each bolt & nut to 5.9 ft-lbs or 8 N-m. You might need to check the torque of the bolts by tightening each of them 2 or 3 times by rotating around the circle.

9. DON'T RIDE YET! You will probably need to raise your front derailleur to allow the outer Q-Ring to pass below the derailleur without scraping. The largest chainring diameter of the outer chainring needs to pass within 1.5mm (1/16th inch) below the outer plate of the derailleur cage in order to guarantee optimized shifting.

10. Take an easy ride the first time you ride the Q-Rings, and don't over exert yourself. If you feel any hint of irritation in your knees, call or visit the shop you bought your Q-Rings from or your local recumbent specialist and they will help you optimize your setup.

Section 5: (Optional) Advanced setup.

Once you have ridden a few hundred Mi/Km with your Q-Rings set to position 2, you will have become accustomed to the feeling of Q's. If you are happy with the Q's as they are, you can ignore this your setup is perfect as it is.

The rules with which you must work to optimize your setup are:

- A higher OCP regulation number is better for acceleration, and a lower regulation number should give a slightly higher top speed.
- If you would like to be able to transfer power earlier in the stroke or get a feeling of more resistance (often for mashers), rotate the chainring to a lower OCP number.
- If you would like to transfer power later on in the stroke or have the feeling of less resistance, rotate the chainring to a higher OCP number.

Do not be surprised if OCP #2 turns out being the best after having experimented!