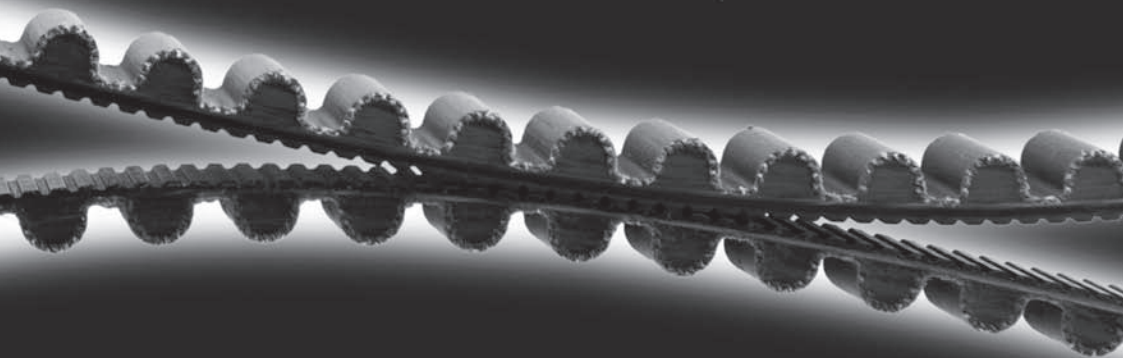




CARBON DRIVE™

Manual for the Gates Carbon Drive™
System used with the Rohloff
SPEEDHUB 500/14



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1

first steps

- **Congratulations!**
- **For your safety**
- **Examples of improper handling**
- **Uncoiling the belt**
- **Examples of improper handling when mounting the drive belt**
- **Dismounting the rear wheel**
- **Mounting the rear wheel**

Congratulations!

Thank you very much for choosing the Gates Carbon Drive™ System for your Rohloff SPEEDHUB 500/14 drive hub. This manual will provide you with all the information necessary for a carefree use of this innovative drive system. If you still have questions about the Gates Carbon Drive System after reading this manual, please contact your retailer or check www.carbondrivesystems.com for further information.



Please note:

We ask you to read this manual thoroughly and completely before you remove the Gates Carbon Drive components from the packaging, start the installation of the components, or use a bike equipped with this drive system. Please follow all the instructions and steps in this manual carefully and keep the manual in a safe place for future reference.

For your safety

Before you ride your bike, always check if the drive belt is properly adjusted and tightened, and if the sprockets are bolted down tightly. Also, check if the Snubber is mounted correctly. Improperly adjusted drive belts might come off the sprockets when you ride the bike. The sprockets and/or the Snubber can also loosen during the ride if they are not tightened sufficiently. Incorrect mounting of the drive system can cause accidents and severe injuries.

Please always follow all of the handling instructions for the drive belt, especially when you mount or dismount your rear wheel. This is where extra care is needed to avoid damaging the belt.

Make sure that body parts do not get between belt and sprockets. Also watch out for any clothing, like turnups on pants, that might become caught in the drive system. When you ride the bike, make sure that you wear appropriate functional clothing.

Please use only original parts and tools to ensure their compatibility.

Follow all of the specific manufacturers' instructions for installing and maintaining the components of your bike. Improper mounting and maintenance of components may cause severe injuries. Therefore, it is recommended to always have the components installed and maintained by a qualified mechanic.

Have your bike checked regularly for safety at a service center that is certified for the mounting and maintenance of the Gates Carbon Drive System and the Rohloff Speedhub 500/14.

After an accident, check your bike for damaged parts and damage to the drive system. If you cannot be sure that the parts are all damage free, replace the components in question.

Make sure that no other bicycle components or objects can come into contact with the Carbon Drive Belt or driveline of the bicycle when transporting the bike, e.g. in the trunk of a car, or whilst being transported with other bicycles on a ski-lift/gondola etc. Be especially careful when your bike is being transported with the rear wheel dismantled.

The Gates Carbon Drive System is only approved as a drive system for bicycles which meet the requirements mentioned in the chapter "Requirements for the frame". The Gates Carbon Drive System is not approved for use on tandem or multi-rider bicycles.

Universal Transmissions GmbH, CD Enterprises and Gates Corporation assume no liability for malfunctions or injuries caused by improper mounting or improper maintenance



Please note:

The Carbon Drive System is not suitable for retrofitting bikes that have not been engineered, designed and built especially for the Carbon Drive system. Only the perfect interaction of Carbon Drive System, crank, bottom bracket unit, hub, dropouts, and frame gate, as well as suited clamping and guidance elements allow for a safe and correct operation. The manufacturer of the frame or bicycle is responsible for choosing the correct components and verifying their proper function/operation.



Please note:

Please be aware that use of the Gates Carbon Drive system in ice and snow, can lead to the teeth of the pulleys becoming clogged. This can lead to the belt being pushed off of the pulley, or lifted up and ratcheting over it. Both of these possibilities could reduce the safe operation of the system. For this reason, the use of the bike in snow and ice should be avoided. The use of the system in clay based mud should also be avoided for the same reasons.

Examples of improper handling

The following illustrations show examples for improper handling of the drive belt. The manipulation illustrated damages the belt. A belt which has been damaged due to improper handling may fail during operation and cause an accident, injury or inconvenience. It should be clear that a damaged or mishandled belt can no longer be used.



Crimping



Twisting



Back bending



Inverting



Zip tying



Using as a wrench



Mounting the tensioned belt with a lever, and/or by rotating the cranks.

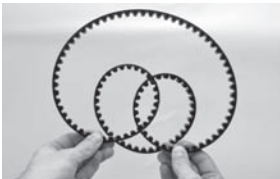


Please note:

Drive belt and sprockets do not need lubrication of any sort. For cleaning, use only water and a soft brush. Please do not use any type of detergent.

Uncoiling the belt

To uncoil the belt, follow the instructions below. Improper uncoiling may cause permanent damage to the belt. It will never be necessary to violently pull the belt. Make sure that the belt is never bent to smaller diameters, as this might damage the carbon fibers inside the belt.



Hold the belt chest high in front of your body. Hold the outer coils with both hands.

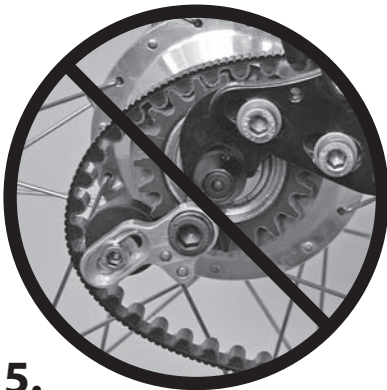
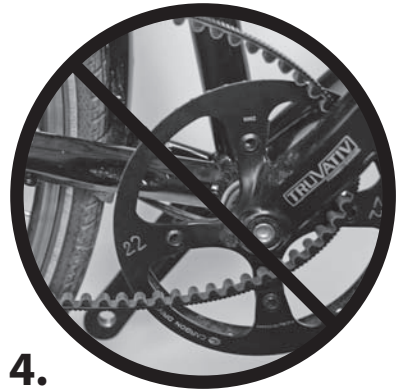
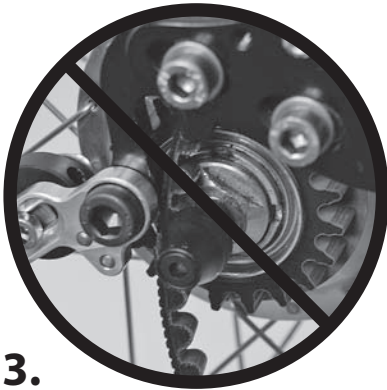


Move your hands away from each other slowly, until the belt uncoils on its own.



Now the belt is properly uncoiled.

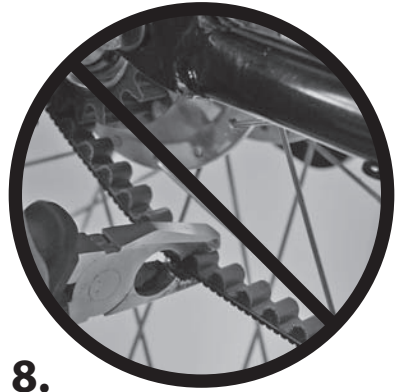
Examples of improper handling when mounting the drive belt





7.

1. Drive belt next to sprocket
2. Consistency, lets stick to one word- Securing the belt with Zip ties.
3. Clamping belt in the dropout
4. Clamping belt behind the crank
5. Drive belt above Snubber wheel
6. Stepping on the belt
7. Clamping belt to the frame
8. Using pliers



8.

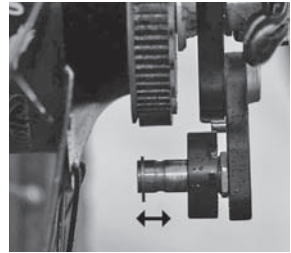


Illustration 1:
Before mounting / dismounting the rear wheel

Dismounting the rear wheel

To dismount the rear wheel, you need to follow the steps below one at-a-time. Separate the Rohloff SPEEDHUB500/14 shifter. Look up the procedure for your version of the hub in your Rohloff SPEEDHUB500/14 manual.

Loosen the long torque arm (if used in your model) according to the Rohloff SPEEDHUB 500/14 manual.

Push the Snubber wheel to the right latching position on the axle. (Illustration 1)

Illustration 1: before mounting/ dismounting the rear wheel

If applicable, unhinge the bowden cable of the rim brake.

Loosen the quick release skewers or axle nut, and take the wheel from the dropouts.

Remove the belt from the rear sprocket. Make sure you handle the belt carefully according to the instructions for proper handling of the belt.

Mounting the rear wheel

Check the fit of the Snubber in the right latching position of the axle according to illustration 1 of the instructions for Dismounting the rear wheel. Hang the drive belt over the bottom bracket of the frame and follow the instructions for Mounting the Gates Carbon Drive Belt (start at step 4).

2

mounting

- **Mounting the Gates Carbon Drive Belt**
- **Checking the belt tension**
- **Checking the belt tension using the Tension Tester**
- **Checking the belt tension without the Tension Tester**
- **Using the Snubber to keep the Gates Carbon Drive Belt from ratcheting**
- **Snubber assembly**
- **Mounting the Snubber**
- **Removing the Snubbers**
- **Mounting the Gates Carbon Drive Front Sprocket**
- **Mounting the Front Sprocket at the crank adapter**
- **Mounting the Gates Carbon Drive Hybrid Rear Sprocket M46x6**
- **Mounting the Rear Sprocket M46x6 to the Gates-Rohloff Carrier M46x6**
- **Retrofitting the rear sprocket to a Rohloff SPEEDHUB**
- **Retrofitting the rear sprocket to a Rohloff SPEEDHUB 500/14 with chain sprocket**
- **Removing the Rear Sprocket M46x6 with Gates-Rohloff Carrier M46x6 from Rohloff SPEEDHUB 500/14**
- **Removing the Gates-Rohloff Carrier from the Rohloff SPEEDHUB 500/14**
- **Removing the Gates-Rohloff Carrier from the rear sprocket**

Mounting the Gates Carbon Drive Belt

The following steps describe how to mount the belt in a bike with already mounted sprockets. If your sprockets have not been mounted yet, please follow the instructions for Mounting front and rear sprockets first. If you have any difficulties with mounting the belt, the video at www.carbondrivesystems.com will help you.



1. Open the frame break or 'gate' on the frame's rear triangle. Since this break may vary from one manufacturer to another, you'll need to follow the instructions of the manufacturer of your frame. In the following illustrations the frame is opened at the dropout. Insert the belt through the opening of the frame.



2. Hang the belt over the bottom bracket and lock the frame gate.



3. Place the belt on the rear sprocket and mount the rear wheel into the rear dropouts.



Minimize the distance between the axle of the bottom bracket and the rear axle so that the belt can be fitted to the front sprocket without tension. The tools required to reduce the distance may vary depending upon manufacturer. Always follow the instructions of the particular

manufacturer. In this example, the rear wheel is moved towards the bottom bracket by horizontally slidable dropouts. It might be necessary to loosen the screws of the disc brake caliper. When you reach the smallest distance between the axle of the bottom bracket and the rear axle, fit the belt to the front sprocket as well.

4. Devices used to tension the belt may vary by manufacturer. Always follow the instructions of the particular manufacturer. In this example, you now tension the belt on the drive side, using the slidable dropouts and the tensioning bolts inside the dropouts. After tensioning the right side (drive side), until the wheel sits evenly between both chainstays.

i Please Note:

Never try to pry the belt on, or “roll” it on by rotating the cranks. This may cause inner structural damage which will result in the belt no longer being useful.



The handling illustrated above can damage the system!



Illustration 3:
Correct alignment of the belt



Illustration 4:
Incorrect alignment of the belt

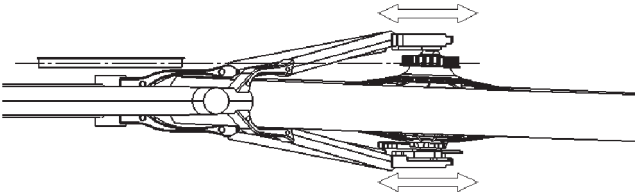


5. Rotate the cranks 10-15 times and check the alignment of the belt. The belt should slightly touch, or come just short of touching the inside flange of the rear sprocket (within 1mm). A constant distance of 0.5mm between belt and flange is recommended.
6. Tension the dropouts on the drive side or loosening them on the non-drive side steers the belt towards the flange of the rear sprocket. Adjust the rear wheel to achieve the right alignment of the belt. Turn the crank again, re-check the belt alignment and re-adjust, if necessary. Make sure to maintain the proper belt tension. Repeat this step until you reach the perfect belt alignment.
7. Reconnect the torque arm (if used with your version) and the gear mech of the hub. Please follow the instructions of the Rohloff SPEEDHUB500/14 manual for your version of the hub. Tighten all bolts of the rear wheel and quick release elements, according to the manufacturer's torque specifications.
8. If you have loosened the bolts of the brake caliper for the mounting, make sure to re-tighten them now. If you have unhinged the bowden cable of your brake, be sure to put it back.

9. If the belt does not align with the front and rear flanges of the sprockets after tightening all the bolts, one of the following actions will help you:
 - a. Adjustment of the belt alignment by fine adjustment of the rear wheel
 - b. Adjustment of the belt alignment at the crank (see Mounting the front sprocket)
10. Now follow the instructions for checking the belt tension.
11. Finally, check to make sure that the Snubber is correctly mounted.

**Please note:**

The following instructions are for frames with horizontally slidable dropouts. These are used differently by various different manufacturers. For a different frame version than described in the following example, please follow the instructions of the particular manufacturer, or ask your certified retailer how to align and tension the belt.



Aligning the belt by adjusting the slidable dropouts

Checking the belt tension

Proper belt tension is essential for optimum operation of the Gates Carbon Drive System.

Lack of belt tension can lead to so-called “ratcheting”. The teeth of the belt will slide over the teeth of the rear sprocket. This causes not only an unpleasant sound, the ratcheting can also cause damage to the carbon tensile cords. This would render a belt useless. If ratcheting has occurred you should replace the belt before the next time it is to be used.

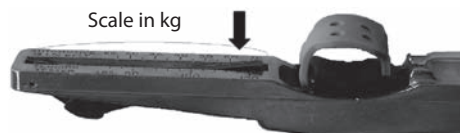
Too much tension can also cause damage to the bearings within the rear hub. It also increases the wear of your drive system and the system can drag.

Checking the belt tension using the Tension Tester

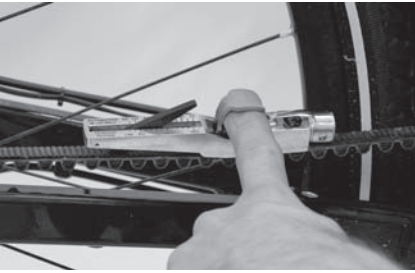
1. Construction: The Tension Tester (Art. No 10400009, illustration 1) has a black plastic measurement arm, located in a slot. Along this slot there is a measuring scale. The point of intersection of the measurement arm and the measuring scale shows the tension of the belt. There is a button (clicking pad) on the upper side of the Tension Tester, where you can secure your finger with a rubberband holder. A spring is located underneath this clicking pad. If a certain pressure is applied to the spring, it makes a clicking sound.
2. The underside of the Tension Tester incorporates a guide rail to help position the Tester correctly along the length of the belt.



Securing the Tension Tester (Art. No 10400009)



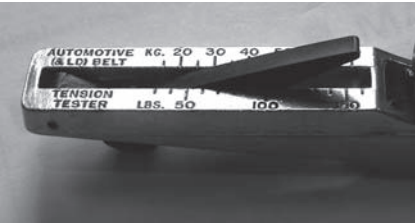
Location of the measurement arm before each measurement process



Measuring the belt tension using the Tension Tester



Location of the measurement arm, when correct tension is achieved



Tension Tester with a numeric scale

3. The Tension Tester allows you to check the tension easily and quickly. Secure one finger between clicking pad and rubber band holder. Before each measuring process the measurement arm has to be pressed into the slot completely.
4. Press the Tension Tester steadily to the middle of the upper side of the belt. The "lip" will lead the tester to the belt. Now slowly increase the pressure on the tester, until you hear a clicking sound. Do not increase the pressure after the tester has clicked. Now remove the tester carefully from the belt. Avoid jerky movements and canting the tester, as this would distort the result of the measurement.

Checking the belt tension without the Tension Tester

Should you need to check or adjust the tension of the belt and a Tension Tester is unavailable, you can apply the force deflection method. This method is not as accurate as using a Tension Tester, but it is still better than not checking the tension at all.

1. Press down on the upper side of the belt between front and rear sprocket with your finger, and exert a force of 20 to 45N (2-4.5 kg). The correct tension is achieved if this force can move the belt down by approximately 10mm.
2. Since the tension may vary a little along the belt, you should repeat this procedure several times. Rotate the cranks a quarter turn after each measurement and measure again.
3. If the tension of the belt is too high or too low, adjust the tension until the measurement result is good.



Please note:

This re-adjustment of the belt tension is done with the tensioning mechanism of the frame. In this example it is done with the adjustment bolts of the dropouts. Proceed as you did when Mounting the Gates Carbon Drive Belt, this means the correct alignment of the belt has to be guaranteed at all times while you adjust the tension. You have to adjust both, the alignment and the tension.

Using the Snubber to keep the Gates Carbon Drive Belt from ratcheting

If the Gates Carbon Drive is used with the Rohloff SPEEDHUB 500/14, a so-called "Snubber" has to be installed. The Snubber guides the belt at the rear sprocket and prevents the belt from ratcheting over the teeth. Ratcheting teeth can damage the inner carbon structure of the belt. This can cause the belt to break when the bike is being used. If you think that the inner structure of your belt might be damaged, you should replace the belt

Snubber assembly

Title	Part Number
CD-RDM-Snubber	10001400
M10x1x12 Snubber-bolt	11002001
Snubber-plate	11002002
Snubber-axle	11002003
Snubber-spring pin	11002004
Snubber-spring	11002005
Snubber-wheel	11002006
Snubber-snap fit	11002007
Snubber-Clip-DIN6799-RA8	11202008
Snubber-long slot bolt	11202009
Snubber-long slot washer	11202010



Illustration 1:
Rohloff SPEEDHUB 500/14
with Snubber

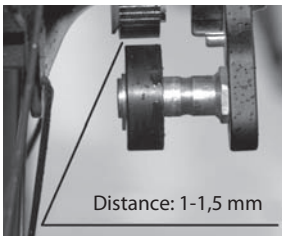


Illustration 2:
The Snubber wheel does
not touch the belt!

Mounting the Snubber

1. The following illustration shows the Snubber mounted to the derailleur hanger. To mount the Snubber, you have to affix the Snubber plate in the thread of the derailleur hanger with a M10x1 screw. Then you have to affix the slidable Snubber axle to the Snubber plate with a M4 screw. The Snubber wheel is located on the Snubber axle. The Snubber wheel is slidable on the Snubber axle. The Snubber wheel latches into an inner and an outer catch position on the axle, to ease the dismounting of the wheel. The Snubber does not influence the degree of efficiency or the smooth operation of the belt, as it does not touch the belt. The Snubber is only for safety purposes.
2. The Snubber plate is screwed to the derailleur hanger with an M10x1 screw. The correct position is shown in illustration 2. The center pin support has to be pushed against the locating surface of the derailleur hanger. The Snubber axle can be adjusted in an elongated slot and it can be affixed with a M6 screw. The Snubber wheel can be slid along the Snubber



Illustration 3:
Side view of the installed Snubber

axle. If the Snubber is located in the left position, it is active and can keep the belt from ratcheting, since the belt cannot slide across the teeth of the rear sprocket. When you adjust the position of the Snubber wheel, make sure that the wheel does not touch the belt.

3. By moving the Snubber axle in the elongated slot of the Snubber plate, you can adjust the distance between the Snubber wheel and the belt. This distance should be between 1mm and 1.5mm.

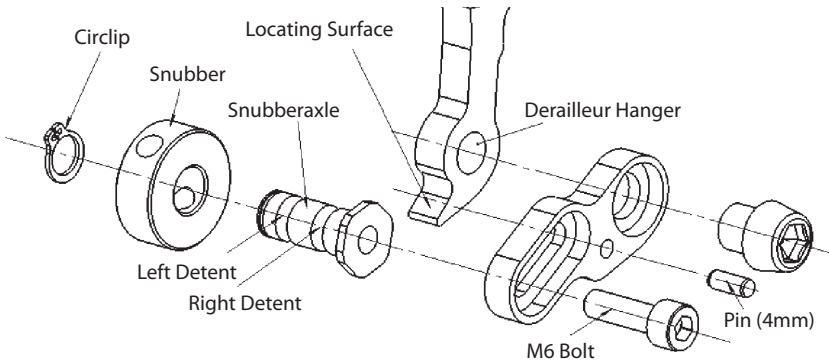


Illustration 4:
Parts of the Snubbers

i Please note:

The Snubber, which is used as an example here, is one possibility to keep the drive belt from ratcheting. Different constructions are possible and used for bikes from other manufacturers. However, any other system has to be checked for its functionality and safety and has to be approved by both Rohloff and Gates.



Snubber version for quick release, vertical dropout use without a derailleur hanger

Removing the Snubbers

Follow the instructions for Mounting the Snubber in the reversed order.

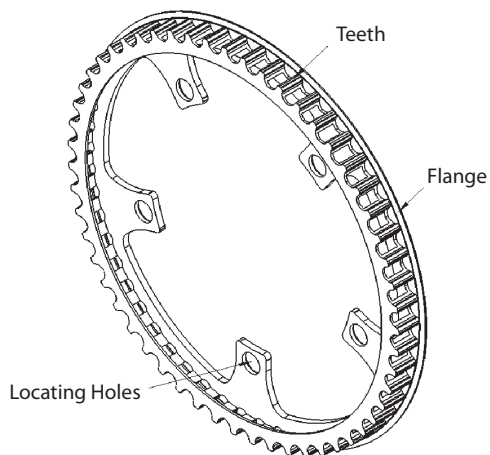
Mounting the Gates Carbon Drive Front Sprocket

Front sprockets are available for the Gates carbon Drive System to fit both 4 and 5 arm crank-sets.

Front Sprocket versions

Teeth	Description	Part Number
46	4-Arm 104mm BC	11464AF10
50	4-Arm 104mm BC	11504AF10
55	5-Arm 130mm BC	11555AF10
60	5-Arm 130mm BC	11605AF10

Front Sprocket (shown here: 55 tooth/5-Arm)





Shim ring for bottom bracket

Art.Nr. 11201023



Shim ring 0.5mm

Art.Nr. 11201020



Shim ring 1mm

Art.Nr. 11201022

Mounting the Front Sprocket at the crank adapter

The sprocket is put over the crank arm and affixed with the sprocket bolts (which were included with your crankset). As shown in illustration 1, the flange of the sprocket is turned outward. To guarantee proper operation of the Gates Carbon Drive System, both sprockets need to be exactly aligned with each other (illustrations 2 and 3). The belt alignment cannot be adjusted on the rear sprocket of the Rohloff SPEEDHUB 500/14. Therefore, you can only adjust it with the position of the front sprocket. The included shim rings have been designed to facilitate this adjustment. For some bottom brackets it is possible to adjust the alignment with shim rings (illustration 4). Please note the mounting instructions from the particular bottom bracket manufacturer.

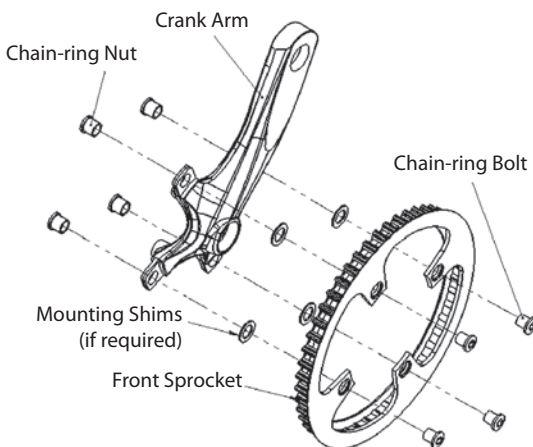


Illustration 1:
Mounting the front sprocket



Illustration 2:
Sprocket alignment

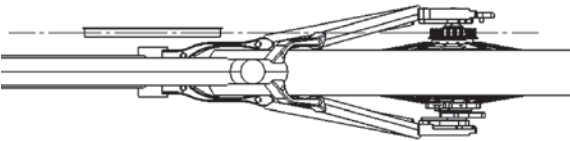
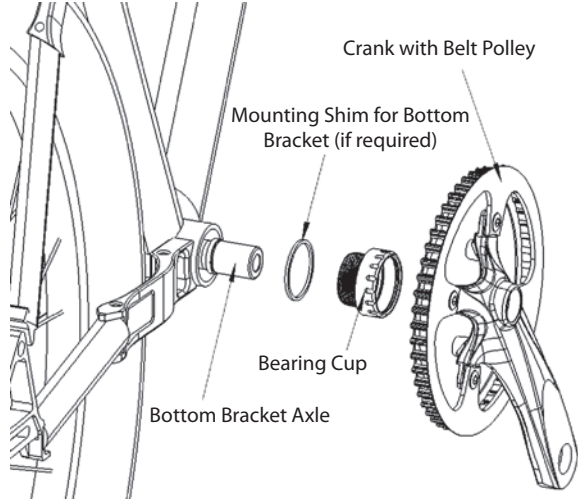


Illustration 3:
Aligning the front sprocket

Illustration 4:
Adjusting the belt alignment with shim rings at the bottom bracket



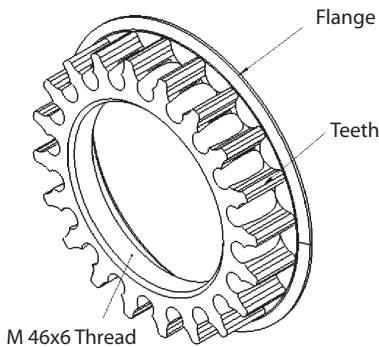
Removing the front sprocket

Follow the instructions for the Mounting the front sprocket in the reversed order.

Mounting the Gates Carbon Drive Hybrid Rear Sprocket M46x6

The Gates Carbon Drive Hybrid Rear Sprocket M46x6 allows you to mount the Gates Carbon Drive System to a carrier which will make it compatible to a variety of rear hubs. In this case to the Rohloff SPEEDHUB 500/14.

Teeth	Part Number
19	10001319
20	10001320
22	10001322
24	10001324



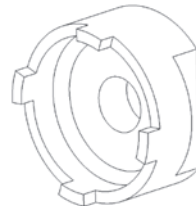
Rear Sprocket M46x6



**Gates-Rohloff Carrier
M46x6 Art. Nr. 8224**
Company - Rohloff



Cone Wrench SW46
Art. Nr. 10400007



Rohloff Sprocket Remover
Art.Nr.8501
Company - Rohloff



Flat Wrench SW46
Art. Nr. 10400006



POM-Sprocket-Key
Art. Nr. siehe Tabelle

Title	Part Number
Basiswerkzeug	10400001
Aufsatz 19 Zähne	10400002
Aufsatz 20 Zähne	10400003
Aufsatz 22 Zähne	10400004
Aufsatz 24 Zähne	10400005

Mounting the Rear Sprocket M46x6 to the Gates-Rohloff Carrier M46x6

The Gates-Rohloff Carrier M46x6 by Rohloff (Art. No. 10300101) is where the Gates Carbon Drive System and the Rohloff SPEEDHUB 500/14 (Illustration 1) come together. At the time of delivery the Gates Carrier may already be fitted to the hub. If this is not the case, please follow the instructions for retrofitting the carrier to your hub.

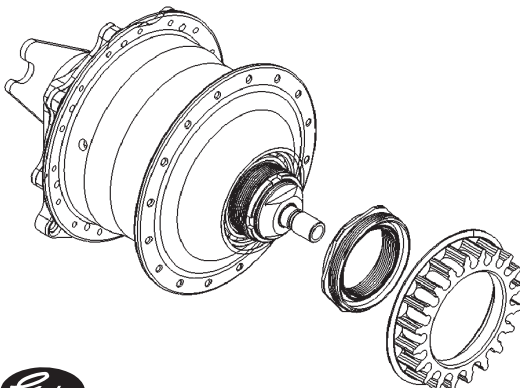


Illustration 1:
Rohloff SPEEDHUB 500/14
with Gates-Rohloff Carrier
M46x6 and Rear Sprocket
M46x6

Lubricate the inner thread of the Rear Sprocket M46x6 and carefully screw it on to the Carrier as far as possible by hand (illustration 3). As shown in illustration 3, the flange of the rear sprocket needs to be on the hub side. Make sure to bring the parts together in the right angle and do not cant them. Tighten the Rear Sprocket M46x6 with the POM-Sprocket-Key (Art. No. 10400001, 1040000X), to keep the sprocket and the Carrier from loosening from the hub in future mounting processes. To keep the hub from rotating while you thread on the carrier, you may hold the driver (sprocket thread) in place with the Rohloff Sprocket Tool and an Open-end Wrench SW24 (illustration 5). Always make sure that the Rohloff Sprocket tool is seated correctly and secured in place.

i Please note:

Always secure the Sprocket tool, as described in the Rohloff Owners Manual (chapter Service, paragraph 3 „Sprocket reversing/replacing“), using a quick release skewer (CC versions), or an axle nut (TS versions), to avoid damage to the driver (sprocket thread). (Illustration 2).



Illustration 2:
Securing the Rohloff Sprocket tool with quick release skewer or axle nut

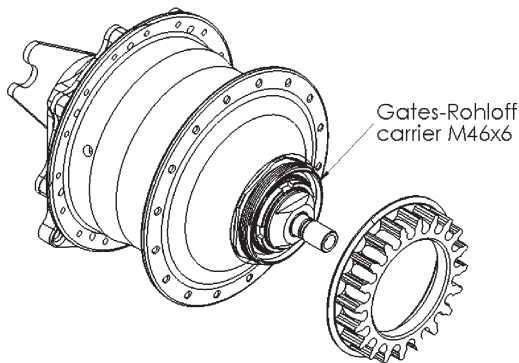


Illustration 3:
Rohloff SPEEDHUB 500/14 with Gates Rohloff Carrier M46x6 and Rear Sprocket M46x6

Retrofitting the rear sprocket to a Rohloff SPEEDHUB

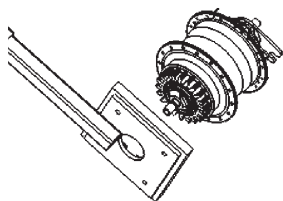


Illustration 4:
Putting the POM-Sprocket-Key on the Rear Sprocket M46x6



Illustration 5:
Tightening the rear sprocket with the POM-Sprocket-Key and using the Open-end wrench SW24 to hold the Rohloff Sprocket tool in place.



Please note:

Only the POM-Sprocket-Key (Art. No. 10400001, 1040000X) is to be used for tightening/loosening the rear sprocket. Never use pliers, a channel lock or similar, as they could damage the protective coating of the sprockets. Using the belt as a tool can damage it and it will not function properly afterwards. An alternative method of tightening the rear sprocket, is to exert pressure on the pedals in the 3 o'clock position when the rear wheel is mounted and the belt is installed. Please have the rear-wheel brake on for this procedure. (Illustration 6).



Illustration 6:
Alternative tightening of the Rear Sprocket by exerting pressure on the pedal when rear-wheel brake is on.

Retrofitting the rear sprocket to a Rohloff SPEEDHUB 500/14 with chain pinion

First remove the rear sprocket from the Rohloff SEEDHUB 500/14 and replace it with the Gates-Rohloff Carrier M34x6.

After you have successfully removed the chain sprocket (see Rohloff Owners Manual chapter Service, paragraph 3 Sprocket reversing/replacing“), clean the driver (sprocket thread), and lubricate the inner thread of the Gates Carrier M34x6.

Ensure that the surfaces of the Carrier touching the Rohloff hub are clean and free of scratches. These two components together form the seal that hinders the oil from leaking out. Now carefully screw the Carrier on clockwise as far as possible by hand (illustration 7). The M46x6 outer thread has to be turned away from the hub. Please consult the instructions for using the Sprocket tool in the Rohloff Owners Manual. Afterwards follow the instructions above.

Removing the Rear Sprocket M46x6 with Gates-Rohloff Carrier M46x6 from Rohloff SPEEDHUB 500/14

i Please note:

As oil may leak from the hub when you remove the chain sprocket from the Rohloff SPEEDHUB 500/14, the driver side of the hub should be turned upward, if possible.

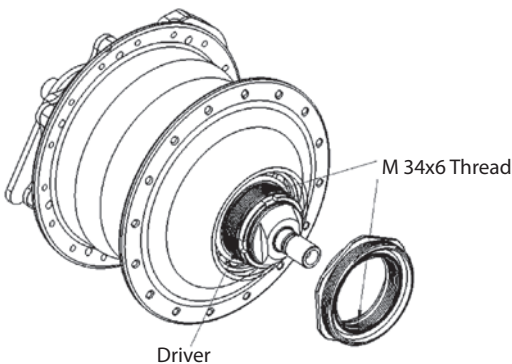


Illustration 7:
Installing the Gates-Rohloff Carrier M46x6 to the M34x6 thread of the driver

i Please note:

When you remove the rear sprocket from the Rohloff SPEEDHUB 500/14, it is impossible to know if the rear sprocket will detach from the Carrier first, or if both components detach from the hub at the same time. Depending on which is the case, follow the particular instructions for separating the components.

As described in paragraph 3 "Sprocket reversing/replacing" in the chapter Service, of the Rohloff Owners Manual, place the Sprocket tool onto the driver (sprocket thread) and secure it in position with the quick release skewer (CC Versions), or the axle nut (TS Versions). Hold the Sprocket tool with the Open-end Wrench SW24 and loosen the rear sprocket with the POM-Sprocket-Key (Art. No. 10400001, 1040000X) by turning it in the opposing direction. (Illustration 8).

Illustration 8:
Mounting the Gates –
Rohloff Carrier M46x6
onto the M34x6 thread
of the SPEEDHUB 500/14
driver.



Removing the Gates-Rohloff Carrier from the Rohloff SPEEDHUB 500/14

The Rohloff Sprocket tool, secured with a quick release skewer or an axle nut, is locked in place by the open-end wrench SW24. You can now loosen the Gates-Rohloff Carrier with a Flat Wrench (Art. No. 10400006) by turning it in the opposing direction to the driver, as shown in illustration 9. To loosen the carrier, exert a sudden pressure on the Flat Wrench SW24 in the opposite direction as the driver.

Illustration 9:
Removal of the Gates –
Rohloff Carrier from the
SPEEDHUB 500/14



i Please note:

Always secure the Sprocket tool as described in the Rohloff Owners Manual (chapter Service, paragraph 3 „Sprocket reversing/replacing“), using a quick release skewer (CC versions), or an axle nut (TS versions), to avoid damage to the driver (sprocket thread).

Removing the Gates-Rohloff Carrier from the rear sprocket

To remove the Carrier from the rear sprocket, you must secure the POM-Sprocket-Key (Art. No. 10400001, 1040000X) in a bench vice, the opening turned upward (illustration 10), and place the rear sprocket into the spanner socket. Turn the Cone Wrench SW46 (Art. No. 10400007, illustration 11) counter clockwise to loosen the Carrier (illustration 12).

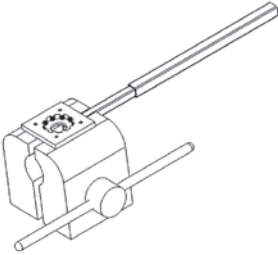


Illustration 10:
POM-Sprocket-Key

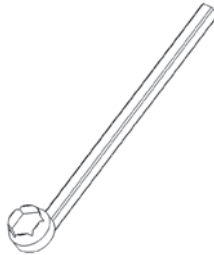


Illustration 11:
Cone Wrench SW46

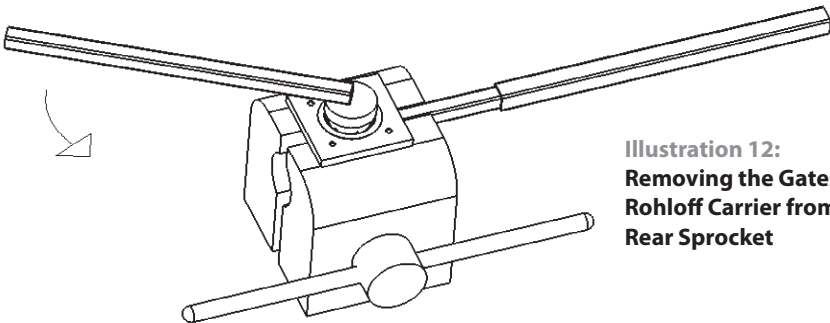


Illustration 12:
**Removing the Gates-
Rohloff Carrier from the
Rear Sprocket**

3

exchange

- **When does the Gates Carbon Drive Belt need to be replaced, when do the sprockets need to be replaced?**
- **Replacing the belt after it has been damaged**
- **Replacing the Sprockets when they have been damaged**
- **Replacing belt and sprockets because of abrasion**

When does the Gates Carbon Drive Belt need to be replaced, when do the sprockets need to be replaced?

The durability of Carbon Drive System components depends on a number of exterior influences and conditions. The life expectancy of belt drive systems or common bike chains is always shorter in rough and muddy conditions, than when they are used in a dry environment. While the bike chain gets clogged with mud, the Gates Carbon Drive System generally stays clean. If a traditional chain is not lubricated correctly it will have a shorter lifespan. This is not the case with a belt, since it does not need any additional lubrication.



Illustration 1:
The Gates Carbon Drive System used in a muddy environment



Please note:

When you first use your new Gates Carbon Drive System, the blue layer on the inside of the belt will wear off quickly. This is no abrasion of the belt. The blue layer is only for production-related purposes. It is a form release agent, used to make it easier to take the belt out of its form during the manufacturing process. It does not influence the function of the belt in any way.

Replacing the belt after it has been damaged

The Gates Carbon Drive Belt should always be replaced if it has been damaged through improper handling (see examples for improper handling), or if it has been damaged through severe exterior conditions. For example, if a stone, a root, or a piece of clothing has been caught in the belt and has been pulled between belt and sprocket. This can cause damage to the sensitive carbon fibers inside the belt, even if there is no damage visible from the outside. If a belt is damaged in this way or if you assume that there might be damage to the belt, you should always replace it, as it might suddenly rip when the bike is being used, and this can cause an accident or severe injury.



Illustration 2:
Wearing off of the blue
layer

Replacing the Sprockets when they have been damaged

The sprockets always need to be replaced if they have been damaged through severe use or exterior influences. If you ride over a rock, or a tree trunk, for example, and you bottom out hard with the front sprocket, it might deform and would have to be replaced. Stones caught between belt and sprocket can cause damage to the teeth of the belt. Teeth might break off partially or completely. When this happens, the particular sprocket has to be replaced. Whether or not the belt has to be replaced would have to be determined with the criteria mentioned above (Replacing the belt after it has been damaged).

Replacing belt and sprockets because of abrasion

Both the belt and sprockets are parts that abrade or wear. Contrary to what you might expect, tests have shown that the belt tends to have a slightly longer life expectancy than the sprockets. You can check the abrasion of belt and sprockets with the Profile Wear Gauge as shown in illustrations 3 and 4. If the gauge result is equal to, or larger than 0.5mm, the particular belt or sprocket will need to be replaced. For a drive system in which all components have been used for the same amount of time it is recommended to replace all components, as soon as one of them needs to be replaced because of wear or abrasion. You can find further information about the use of your Profile Wear Gauge in the separate manual.

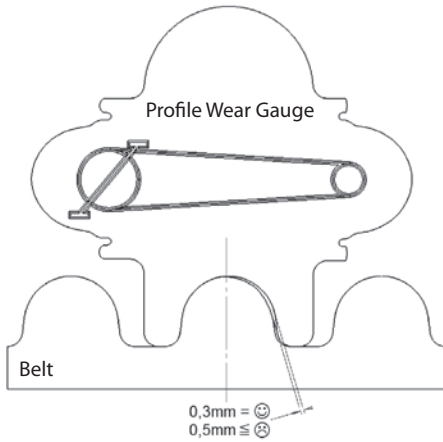


Illustration 3:
Checking the abrasion of the belt

3

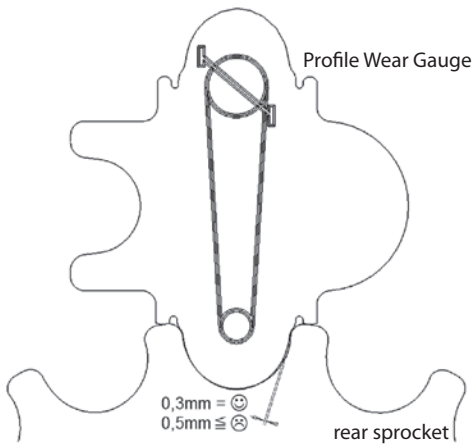


Illustration 4:
One-sided abrasion upon the teeth of the rear sprocket

i Please note:

Small cracks on the back of the belt may occur after some amount of use. These are normal. If there are cracks at the dedendum (the radial distance between the pitch circle and the bottom of the tooth), however, the belt will need to be replaced.

4

for Frame builders

- **Frame requirements when mounting the Gates Carbon Drive**
- **Possibilities for tensioning and adjustment**
- **Straightness and stiffness of the frame**

Frame requirements when mounting the Gates Carbon Drive

Opening the frame

A specific rear triangle is required for mounting the Gates Carbon Drive System. Since the belt cannot be separated and rejoined like a bike chain, it has to be possible to open the frame at the rear triangle. This opening should allow a gap of at least 8mm. There are several possible solutions, depending upon desired style. Illustrations 1 and 2 show a frame with the opening at the dropout. A separation of the right chainstay or at the seatstay of the frame is also possible. (Illustration 3).

4



Illustration 1:
**Opening the frame to
mount the belt**

Possibilities for tensioning and adjustment

It has to be possible to tension and adjust the belt after it is mounted in the frame. This is possible through the use of either adjustable dropouts (illustration 2) or with an eccentric adjuster around the bottom bracket.

However, the safety of the belt can only be guaranteed if the correctly adjusted tension is not altered when the rear wheel is dismounted (in the case of a puncture, for example). The frame construction must allow for this.

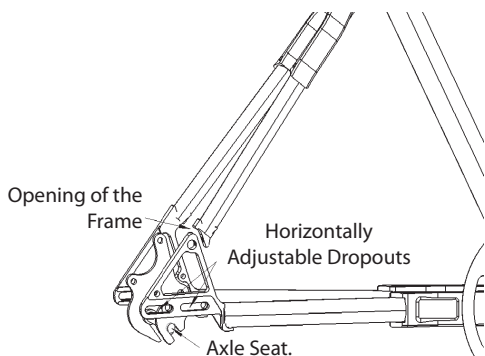


Illustration 2:
Example for frame construction



Illustration 3:
Example for frame construction: separation of the seat stay

Straightness and stiffness of the frame

For the smooth operation of the Gates Carbon Drive System, the frame needs to be straight and stiff. These requirements are specified in the Gates Technical Manual for Frame Builders. Furthermore, the adjustable range of lengths between bottom bracket housing and rear axle should be between 16 and 30mm, to guarantee a sufficient tensioning function and the possibility of changing the gear ratio.



Please note:

You can find all information and the frame construction requirements for using the Gates Carbon Drive System in the Gates Technical Manual for Frame Builders Manual at www.carbondrivesystems.com.

5

Gear Ratio Comparisum

- **Comparing the gear ratio of a Rohloff SPEEDHUB 500/14 with a Gates Carbon Drive System to a derailleur gear system**
- **Comparing the gear ratio of a Rohloff SPEEDHUB 500/14 chain sprocket to a Gates Carbon Drive Sprocket**
- **Tables of distance traveled per crank revolution for Rohloff SPEEDHUB 500/14 with Gates Carbon Drive Sprockets**
- **Comparing the gear ratio of a derailleur system to that of the Rohloff SPEEDHUB 500/14 with Gates Carbon Drive Sprocket**

Comparing the gear ratio of a Rohloff SPEEDHUB 500/14 with a Gates Carbon Drive System to a derailleur gear system

The overall gear ratio is 526%, meaning the highest gear is 5.26 times higher than the lowest gear. The 14 gears are evenly graded. The gear ratio of the Rohloff SPEEDHUB 500/14 can be adapted to certain conditions by varying the choice of front and rear sprockets. You can choose from the versions listed in the table below. As the number of new versions increases, an up-to-date selection of available sprockets can be found under www.carbondrivesystems.com for the complete selection.

Teeth	Part Number	Versions of Rear Sprockets M46x6
19	1119RAF10	
20	1120RAF10	
22	1122RAF10	
24	1124RAF10	

Teeth	Part Number		Versions of Front Sprockets
46	4 bolt 104mm BC	11464AF10	
50	4 bolt 104mm BC	11504AF10	
55	5 bolt 130mm BC	11555AF10	
60	5 bolt 130mm BC	11605AF10	

Comparing the gear ratio of a Rohloff SPEEDHUB 500/14 chain sprocket to a Gates

The following table shows, which sprocket-size combination of chain sprockets for the Rohloff SPEEDHUB 500/14 equates to the possible combinations of the Gates Carbon Drive Sprocket. You can find the actual sprocket gear ratio in brackets.

	19 Teeth rear	20 Teeth rear	22 Teeth rear	24 Teeth rear
46 teeth front	(2,42) ≈ 42/17	not permitted	not permitted	not permitted
50 teeth front	(2,63) ≈ 42/16	(2,50) ≈ 40/16	not permitted	not permitted
55 teeth front	(2,89) ≈ 46/16	(2,75) ≈ 44/16	(2,50) ≈ 40/16	not permitted
60 teeth front	(3,16) ≈ 50/16	(3,00) ≈ 48/16	(2,73) ≈ 46/17	(2,50) ≈ 40/16



Please note:

Smallest permitted belt gear ratio:

The belt gear ratio of the Rohloff SPEEDHUB 500/14 converts the low number of revolutions of the crank to a high number of revolutions at the rear sprocket and reduces the incoming torque for the transmission in the same ratio. To exclude an overload of the transmission, the sprocket gear ratio must not be lower than 2.35. This equates to the sprocket-size combinations of 46/19, 50/20, 55/22, and 60/24. Bigger sprockets can be used without any restrictions.

5

Tables of distance traveled per crank revolution for Rohloff SPEEDHUB 500/14 with Gates Carbon Drive Sprockets

In the following tables the distance traveled per crank revolution is measured in meters for the 1st and the 14th gear of the Rohloff SPEEDHUB 500/14 respectively. Depending on the given gear ratio of the belt, the possible distances traveled per crank revolution for the common wheel circumferences (20", 26", and 28") can be read out. The tables are based on the following context:

Distance traveled per crank
revolution

$$= \frac{U \times F \times \dot{U} \text{ Getr.}}{R}$$

The formula consists of:

U = wheel circumference

F = amount of teeth of the front sprocket

R = amount of teeth of the rear sprocket

Gear ratio = inner gear ratio according to table below

Gear	1	2	3	4	5	6	7	8
Gear ratio	0,279	0,316	0,360	0,409	0,464	0,528	0,600	0,682

Gear	9	10	11	12	13	14
Gear ratio	0,774	0,881	1,000	1,135	1,292	1,467

Table of distance traveled per crank revolution Rohloff SPEEDHUB 500/14 for 20" wheels (wheel circumference 1.51m)

	19 Teeth rear		20 Teeth rear		22 Teeth rear		24 Teeth rear	
	From	To	From	To	From	To	From	To
46 teeth front	1,02m	- 5,36m	nicht zugelassen		nicht zugelassen		nicht zugelassen	
50 teeth front	1,11m	- 5,83m	1,05m - 5,54m		nicht zugelassen		nicht zugelassen	
55 teeth front	1,22m	- 6,41m	1,16m - 6,09m		1,05m - 5,54m		nicht zugelassen	
60 teeth front	1,33m	- 7,00m	1,26m - 6,65m		1,15m - 6,04m		1,05m - 5,54m	

Table of distance traveled per crank revolution Rohloff SPEEDHUB 500/14 for 26" wheels (wheel circumference 2.06m)

	19 Teeth rear		20 Teeth rear		22 Teeth rear		24 Teeth rear	
	From	To	From	To	From	To	From	To
46 teeth front	1,39m	- 7,32m	nicht zugelassen		nicht zugelassen		nicht zugelassen	
50 teeth front	1,51m	- 7,95m	1,44m - 7,56m		nicht zugelassen		nicht zugelassen	
55 teeth front	1,66m	- 8,75m	1,58m - 8,31m		1,44m - 7,56m		nicht zugelassen	
60 teeth front	1,81m	- 9,54m	1,72m - 9,07m		1,57m - 8,24m		1,44m - 7,56m	

Table of distance traveled per crank revolution Rohloff SPEEDHUB 500/14 for 28" wheels (wheel circumference 2.18m)

	19 Teeth rear		20 Teeth rear		22 Teeth rear		24 Teeth rear	
	From	To	From	To	From	To	From	To
46 teeth front	1,39m	- 7,32m	nicht zugelassen		nicht zugelassen		nicht zugelassen	
50 teeth front	1,51m	- 7,95m	1,52m - 8,00m		nicht zugelassen		nicht zugelassen	
55 teeth front	1,66m	- 8,75m	1,67m - 8,79m		1,52m - 8,00m		nicht zugelassen	
60 teeth front	1,81m	- 9,54m	1,82m - 9,59m		1,66m - 8,72m		1,52m - 8,00m	

Comparing the gear ratio of a derailleur system to that of the Rohloff SPEEDHUB 500/14 with Gates Carbon Drive Sprocket

The following chart shows, which gear ratio of the belt is needed with the Rohloff SPEEDHUB 500/14 to equate to the lowest gear and the highest gear of a derailleur system. For comparison purposes we have also stated the possible chain gear ratios.

Sprocket-size combination lowest gear derailleur

	1st gear of Rohloff SPEEDHUB 500/14 with a chain sprocket	1st gear of Rohloff SPEEDHUB 500/14 with a belt sprocket
22/34	32/13 36/15 38/16 40/17	46/19
24/34	34/13 38/15 42/16 44/17	50/19
26/34	36/13 42/15 44/16 48/17	55/20
20/32	32/13 42/15 38/16 40/17	46/19
22/32	34/13 38/15 40/16 42/17	50/20 55/22 60/24
24/32	36/13 42/15 44/16 46/17	55/20 60/22
26/32	38/13 44/15 48/16 50/17	55/19 60/20
20/30	32/13 36/15 40/16 42/17	46/19 50/20 55/22 60/24
22/30	36/13 40/15 44/16 46/17	50/19 60/22
24/30	38/13 44/15 46/16 50/17	55/19 60/20
26/30	42/13 48/15 50/16 54/17	60/19

Sprocket-size combination highest gear derailleur

	14th gear of Rohloff SPEEDHUB 500/14 with a chain sprocket	14th gear of Rohloff SPEEDHUB 500/14 with a belt sprocket
42/11	34/13 40/15 42/16 46/17	50/19
44/11	36/13 42/15 44/16 48/17	55/20 60/22
46/11	38/13 44/15 46/16 50/17	55/19
48/11	40/13 46/15 48/16 52/17	60/20
50/11	42/13 48/15 50/16 54/17	60/19
52/11	42/13 50/15 52/16 56/17	60/19
54/11	44/13 52/15 54/16 58/17	60/19
42/12	32/13 36/15 40/16 42/17	46/19 50/20 55/22 60/24
44/12	34/13 38/15 40/16 44/17	50/20 55/22 60/24
46/12	34/13 40/15 42/16 46/17	50/19
48/12	36/13 42/15 44/16 48/17	55/20
50/12	38/13 44/15 46/16 50/17	55/19
52/12	40/13 46/15 48/16 52/17	60/20
54/12	40/13 48/15 50/16 54/17	60/19

GATES CARBON DRIVE™ SYSTEM Product Warranty

We obligate ourselves to make sure that the products we deliver are absolutely free of defects in materials and workmanship at the time of purchase. Therefore, we warrant our products for a period of two years from the time of purchase. This warranty only applies to the original purchase from a dealer. If we notice defects in a product, we reserve the right to repair or exchange the purchased product. These are the only exclusive rights.

The normal abrasion of wear parts is excluded from our warranty. Wear parts include all parts that wear and tear when they are used. In the Gates Carbon Drive System there is abrasion of the contact surface of drive belt and sprockets. The extent of this abrasion depends on the correct adjustment of the system, and on the using conditions. Taking rides in muddy, dusty, rainy, or snowy surroundings will cause faster abrasion than riding in clean and dry surroundings.

The warranty does not apply to defects due to abuse, misuse, insufficient maintenance, or the negligence of the Carbon Drive System mounting instructions. Please read the instructions carefully before you use one of our products. You can find the instructions at <http://www.carbondrivesystems.com>. For warranty claims please contact the dealer you bought the product from.

The warranties stated above are the only warranties given to you. No other warranties express or implied, are given. We also reject to guarantee the applicability for a particular purpose and marketability. We assume no liability for consequential damage, and collateral damage.

Some states and countries do not allow exclusions or limitations of damages. There are also states and countries that do not allow limitations to the time period of a warranty. It may, therefore, be possible that the limitations above do not apply to you. Warranty rights may vary from state to state and this allows you to claim your particular right.



A Tomkins Company

Gates Corporation

1551 Wewatta Street, Denver, CO 80202
www.gates.com

Find more information for Europe:

Universal Transmissions GMBH
Külfalstr. 18
31093 Lübbecke
Germany

Tel: +49 5185 60266-50
Fax: +49 5185 957192

info@carbondrive.net
www.carbondrive.net
www.carbondrivesystems.com

*Find more information for North America and
South America:*

CD Enterprises
801 Brickyard Circle
Golden, CO 80403

Phone: 303.278.3955

frank@carbondrivesystems.com
www.carbondrivesystems.com

