



**CARBON
DRIVE™**

MODULE **TECHNICAL RESOURCES**

CONTENTS

- 3 Introduction
- 4 Frame Design
- 8 Frame Tolerances & Stiffness Requirements
- 10 Belt Tensioning
- 11 Tension Measurement Tools
- 15 Alignment/Installation/Removal Tools
- 18 Additional Online Resources
- 20 Tandem Stoker Drives
- 22 Troubleshooting
- 25 Glossary
- 26 Warranty & Contact Info



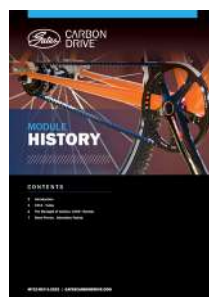
MODULE TECHNICAL RESOURCES

Frame design details, including dropout and frame stiffness and alignment requirements, assembly tolerances, online resources, available tools, troubleshooting, and a glossary.



MODULE OWNER'S MANUAL

This manual explains proper belt handling, contains information about proper care and tensioning as well as warranty information.



MODULE HISTORY

Gates Corporation has been a global leader in power transmission and belt drive technologies since 1911, this module explains how Gates Carbon Drive evolved.



MODULE PRODUCT LINES

Comparisons of our systems, their ideal applications, and guidance in choosing the right system for you.



MODULE APPLICATIONS

A quick look at the hub and mid-motors, gearboxes, internal gear hubs and cranksets we support.



MODULE COMPONENTS

Our current product listing. Includes belts, front and rear sprockets.



MODULE ASSEMBLIES

Technical information for eBike integration and specification of Gates cranksets.

OEM / ASSEMBLER / BIKE SHOP RESOURCES

Gates Carbon Drive continues to make belt drive implementation, assembly, and maintenance as easy as possible. Please reference this module for all technical guidance and requirements to ensure safe, efficient, and durable performance of your Gates Carbon Drive system.

RESOURCES



BELT HANDLING



TENSION



ALIGNMENT



WARRANTY

ISO REQUIREMENTS

Gates Carbon Drive products meet or exceed the standards set forth in the applicable requirements in ISO 4210-2 and ISO 4210-8. While individual Carbon Drive components sold by Gates meet or exceed these ISO requirements, it is the sole responsibility of the bicycle original equipment manufacturer (OEM) to configure the Gates Carbon Drive components in a way that meets or exceeds the ISO requirements for their particular bicycle model, especially regarding protective devices.

Note: All dimensions in millimeters unless otherwise noted.

CARBON DRIVE™

Gates® Carbon Drive™ Bicycle Calculator
[Get your Design Guide here](#)

CARBON DRIVE™

Front Chaining (Teeth)
 Rear Cog (Teeth)
 Gear Ratio
 Chainstay (mm)

☒ Advanced Options
 Tire Size
 Crank (mm)

Front Sprocket mounts:
Rear Sprocket mounts:
 9 spline hub, Nexus, Alfine, SureFit 3-Lobe, NuVinci
 Development: 3.09 (m), Gear Inches: 38.777 (in), Gain Ratio: Infinity

Rank	Gear Ratio	Front Sprocket (Teeth)	Rear Sprocket (Teeth)	Belt Length (Teeth)	Chainstay Length (mm)
1	2.423	63	26	108	343.12
2	2.423	63	26	111	359.90
3	2.423	63	26	113	371.08
4	2.423	63	26	115	382.25

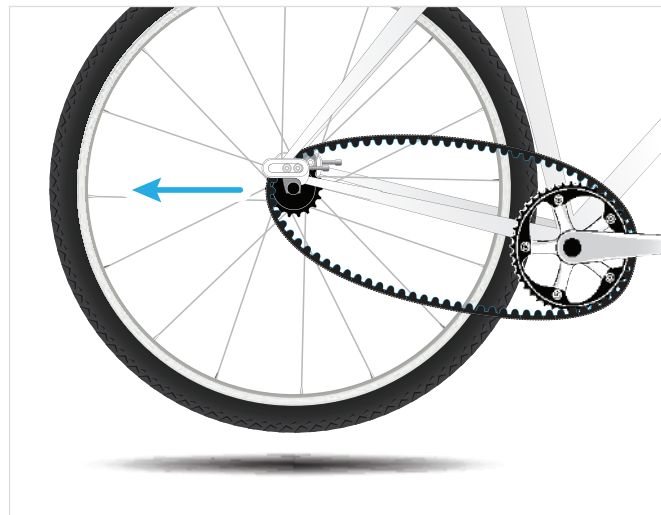
Sprocket selection is impacted by the target gear ratio, frame chainstay length, and available belt lengths. To simplify the selection process, use our drive calculator online at GatesCarbonDrive.com/DriveCalculator or download from GatesCarbonDrive.com/Manuals

CENTER DISTANCE ADJUSTMENT

To allow for belt installation and tensioning, adjustment in the chainstay length or “center distance” is required. To install a belt, there must be enough room so the belt can slip over the sprockets, achieved by decreasing the center distance between sprockets. It is important to note that the belt must be installed loose, not rolled or pried onto the sprockets while under tension.

Once the belt is installed onto the sprockets, there must be a way to take up the slack in the drive. If only one ratio is desired for the application, a minimum range of movement of 12 mm is needed – 10 mm shorter than nominal for installation room, and 2 mm longer than nominal for tensioning and tolerance take-up. More center distance range may be desired to enable the bike to use different sprockets enabling multiple gear ratio combinations.

Center distance adjustments are typically made through rear axle movement with a sliding dropout, horizontal dropout, or bottom bracket axle movement with an eccentric bottom bracket. When using an eccentric bottom bracket, pay close attention to the sprocket selection, chainstay length, and center distance due to the limited range of adjustment typical eccentric BB shells provide.



**REVIEW REAR
WHEEL REMOVAL
& INSTALLATION.**



INCORPORATING A GATES CARBON DRIVE BELT SYSTEM REQUIRES AN OPENING IN THE REAR TRIANGLE

FRAME BREAK

To incorporate a belt drive, a bicycle frame requires an opening in the rear triangle. Without a master link, a belt requires an opening in the rear triangle to be installed. The opening can be at the dropout or can be in one of the stays. Frame manufacturers have found various ways to accommodate the opening.



**CAUTION MUST BE USED BEFORE AND DURING INSTALLATION.
REVIEW BELT HANDLING.**



FRAME DESIGN

THERE ARE MANY DIFFERENT STYLES OF DROPOUTS AVAILABLE BUT MOST GENERALLY FALL INTO TWO CATEGORIES – VERTICAL AND HORIZONTAL

DROPOUT DESIGN

VERTICAL DROPOUTS

The benefit to a vertical dropout is that once tension and alignment of the belt have been set (assuming the mounting hardware has been properly tightened), the rear wheel can be released, and reinstalled without having to start over with the alignment and tensioning process. Furthermore, quick release type skewers can be used, because the clamping force of the skewer is not holding the belt tension. Vertical dropouts do not possess, by themselves, a center distance change, or tension adjustment capability. This means a secondary tension mechanism is required (eccentric bottom bracket, eccentric hub, or dropout slider).



HORIZONTAL DROPOUTS

Horizontal dropout designs are not ideal for belt drives. Horizontal dropouts almost always have some sort of center distance adjustment, allowing the use of various belt lengths and sprocket combinations. A key factor to consider is the need to realign and tension the belt every time you take the belt off or need to remove the rear wheel. Component selection is also important when using horizontal dropouts and may be more limited. For example, a standard 5 mm quick release does not produce the necessary clamping force to keep the rear wheel from moving under heavy loading, therefore features such as positive tensioning stops must be built into the dropouts or secondary axle tension devices may be required.



SUSPENSION FRAME CONSIDERATIONS

In the earliest possible stages of designing a Carbon Drive compatible rear suspension frame, there are critical engineering factors which must be taken into consideration. In general, full suspension frame designs result in some form of chain growth. Chain growth being defined as a change in the resting distance between the axis of the bottom bracket axle and the axis of the rear hub axle. Because the belt does not have the ability to stretch and the tension in the belt must remain constant, even the smallest amount of chain growth during suspension travel would be detrimental to the system integrity. Devices which compensate for drivetrain slack - such as spring loaded idlers or chain guides - are not allowed unless specifically reviewed and approved by Gates.

If a full suspension frame design which utilizes the Carbon Drive system is desired, please contact the Carbon Drive Team (CarbonDrive@Gates.com) for engineering and development assistance.

BRAKES

Gates requires a hand brake as part of the braking system. Gates does not recommend the use of brake systems that incorporate the use of the belt drive as the only brake system, such as coaster brakes and fixed gears. If belt drive brake systems are installed, Gates still requires the bike to have a hand brake.



TENSIONER INTEGRATION

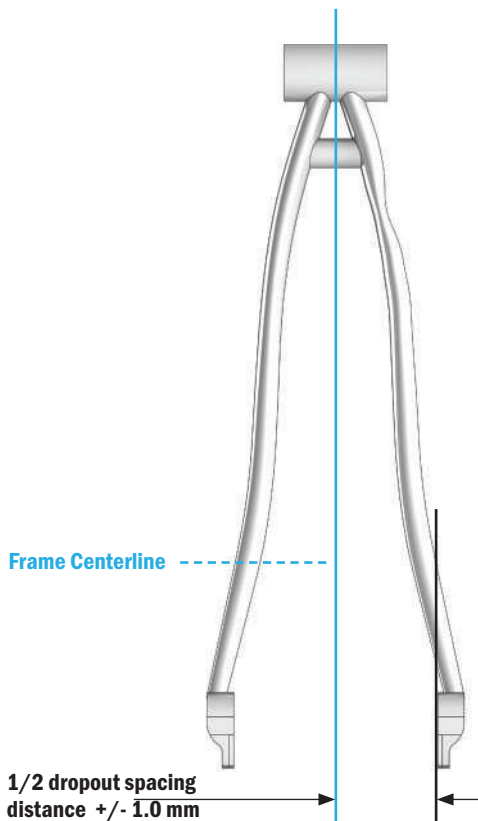
Gates Carbon Drive has been working with bicycle manufacturers to properly design and implement idlers into some specific applications. For each application, thorough testing of the drive is completed, and certain parameters need to be met prior to releasing the bike to the market. Our belt handling instructions must still be followed, as back bending belts by hand could cause damage. Idlers that follow our design requirements do not cause belt failures. All idler designs require approval by Gates Carbon Drive engineering team.

FRAME DESIGN

THERE ARE 3 PRIMARY TYPES OF REAR TRIANGLE ALIGNMENT WHICH DIRECTLY IMPACT THE PERFORMANCE OF THE BELT DRIVE SYSTEM

CENTERLINE OFFSET

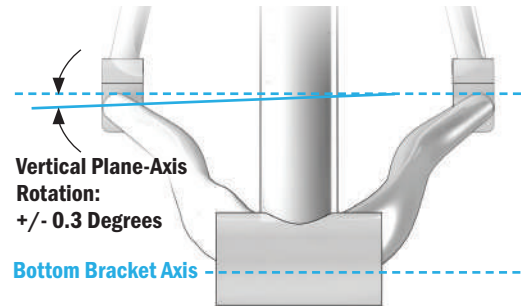
The distance between the center plane of the frame and the inside face of the dropout.



AXIS ALIGNMENT

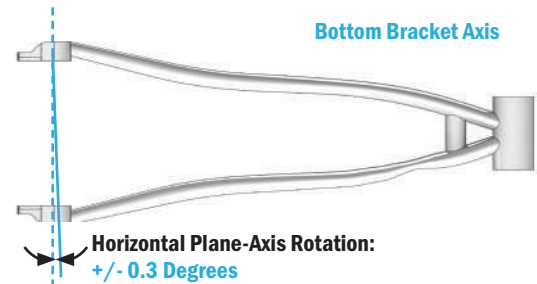
VERTICAL PLANE

Refers to the parallel relationship between the axis of the bottom bracket and the axis of the rear hub in the vertical plane.



HORIZONTAL PLANE

Refers to the parallel relationship between the axis of the bottom bracket and the axis of the rear hub in the horizontal plane.

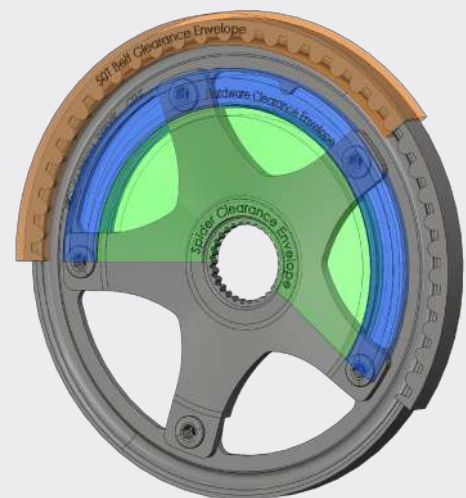


BELT SYSTEM CLEARANCE REQUIREMENTS

When designing a bicycle with a Gates Carbon Drive belt system, certain clearance requirements must be met to ensure the belt or sprocket components do not interfere with components of the frame, bicycle components, or eBike system.

In particular, close attention must be paid to chainstay clearance and mid-motor eBike system frame brackets, drive units, and cosmetic covers/guards.

The belt requires a clearance of 2.0mm from other components to account for deflection and tolerances. Gates can provide CAD Envelopes upon request, models with the specific clearance tolerances already built in.



FRAME STIFFNESS

WHY IS IT IMPORTANT?

The stiffness of a frame's rear triangle plays a major role in the performance of the belt drive system.

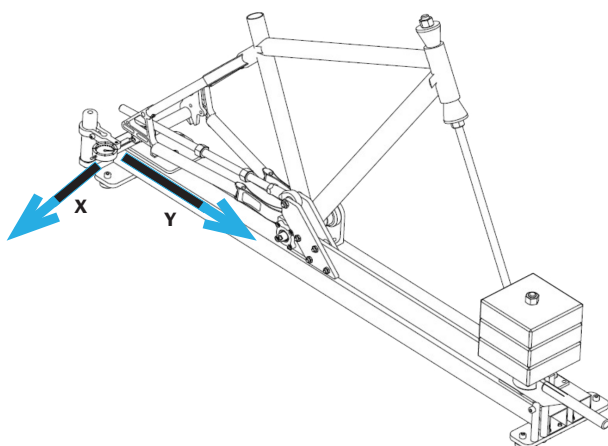
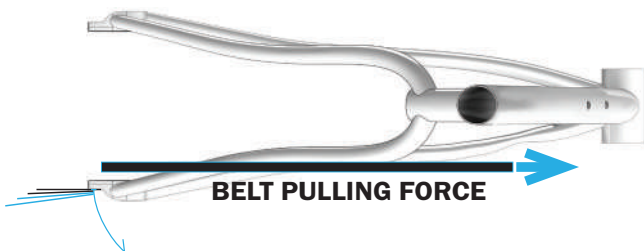
If the rear triangle of a frame is too flexible, it is possible that frame deflection can result in tooth jumping, accelerated wear, drivetrain noise, or in extreme cases, belt derailment. Excessively high rear triangle stiffness can result in an uncomfortable ride.

HOW IS IT MEASURED?

Gates engineers have developed a non-destructive method for measuring rear triangle stiffness, and this evaluation service is offered by Gates to all frame designers as a product development tool. Frame testing requires submission of a complete frameset to one of our three engineering development centers located in Germany, Taiwan, and USA, which will be returned upon completion of testing.

STIFFNESS REQUIREMENTS

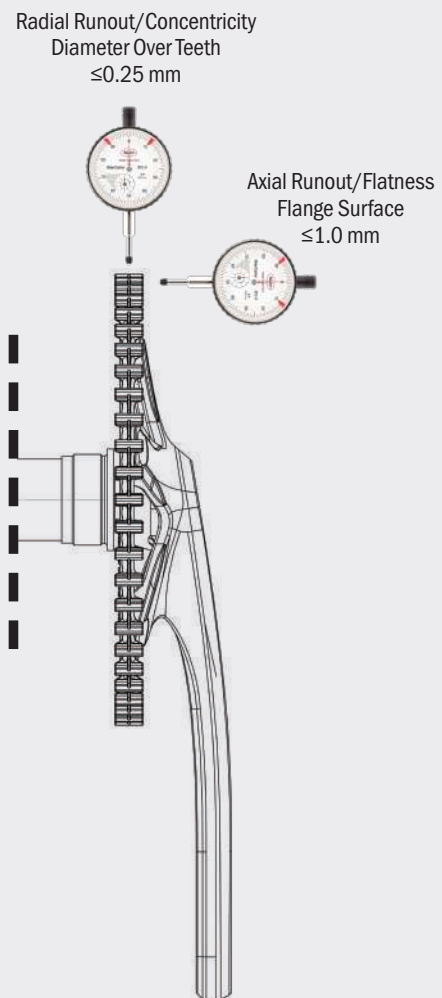
X QUOTIENT (MINIMUM)	Y QUOTIENT (MINIMUM)
5.0 kg/mm	26.5 kg/mm



CRANK/SPROCKET ASSEMBLY TOLERANCES:

To ensure optimal performance of belt drives, Gates requires the following runout tolerances for crank/sprocket assemblies measured with the intended bottom bracket. Excessive runout can result in large tension variation, improper shifting on geared hubs, and even premature belt failure.

Total radial runout allowed is less than or equal to 0.25 mm measured at diameter over teeth. Total axial runout allowed is less than or equal to 1.0 mm measured at flange surface.



IMPORTANT: Sprocket alignment must be maintained under rider pedaling conditions. Excessive deflection of drivetrain components (crank assembly, spider assembly, bottom bracket, etc.) can cause tooth jump, derailment, or belt failure. Complete bicycle assembly must maintain sprocket alignment within +/- 1.0mm.

BELT TENSIONING

PROPER BELT TENSION IS ESSENTIAL FOR OPTIMUM OPERATION OF THE GATES CARBON DRIVE SYSTEM

Lack of belt tension can lead to tooth jump or skipping, potentially causing damage to the belt when the teeth of the belt slide over the teeth of the rear sprocket. Too much tension can damage bearings, can cause the system to drag, and can increase the wear of your drive system.

Tensioning procedures vary depending on the bike. Common types of tensioning systems include sliding or pivoting dropouts and eccentric bottom brackets.

Note – correct alignment of the belt has to be maintained as you adjust tension.

For assemblers and OEMs, there are 3 common methods for measuring tension on the Gates Carbon Drive system: physical force using the Gates Carbon Drive Kriket Gauge, Professional Belt Tension Gauge, or Eco Tension Tester, and sonic frequency measurements using the Gates Carbon Drive Mobile App or Sonic Tension Meter. For each of these, the tension may vary a little along the belt, so you should repeat this procedure several times. Rotate the cranks a quarter turn after each measurement and measure again.

The tools only measure tension, they do not specify a needed tension. Refer to the chart below for the correct tension range recommendation for your Gates Carbon Drive setup.

TENSION REQUIREMENTS

TENSION	35 Hz	40 Hz	45 Hz	50 Hz	55 Hz	60 Hz	65 Hz
	28 lbs	32 lbs	35 lbs	40 lbs	43 lbs	45 lbs	48 lbs
	13 kg	15 kg	16 kg	18 kg	19 kg	20 kg	22 kg
Internal Gear Hub: Mid-Motor eBike System							
Internal Gear Hub: Pedal Bike, Hub Motor eBike							
Non-Gear Hub: MTB, Gearbox, Tandem, Cargo, Single-Speed							

● Indicates recommended tension setting.

■ Acceptable tension range; tension may need to be adjusted within this range, but should never be set lower than the minimum range provided

■ Tension higher than the recommended range may negatively affect shifting performance, drivetrain bearing life, and system efficiency

■ Tension should never be lower than minimum tension, as tooth jump and reduced belt life are possible

DEBRIS SHEDDING / ADVERSE CONDITIONS

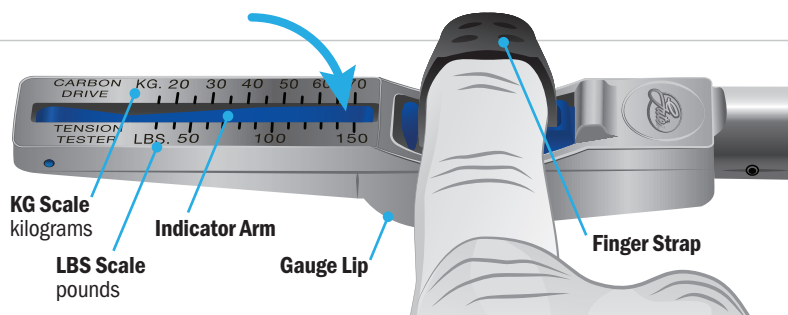
In general Gates Carbon Drive belt systems perform very well in adverse conditions. However, some basic maintenance or protection may be necessary in some situations. Here are some guidelines specific to adverse/winter use conditions:

- For applications that will see occasional snow or debris being packed into the rear sprocket, a higher installation tension is advised to help with clearing the debris through the relief ports of the sprockets
- If belt drive system is exposed and left out to accumulate snow or ice, it is recommended to remove the accumulation before riding
- If heavy or wet snow, mud, or debris becomes packed up around the rear sprocket, it is advised to clean it out before continuing to ride
- In conditions where wet, heavy snow is expected to become packed into the drive, a guard or deflector is recommended to keep debris out of the drive

If debris is packed into drive too tightly, the sprocket or belt can derail, which can cause damage to the cords and potential failure. Higher installation tensions can help, but will not prevent this potential failure entirely. Applications that routinely operate in harsh snow or ice conditions should use a cover or deflector to eliminate these issues.

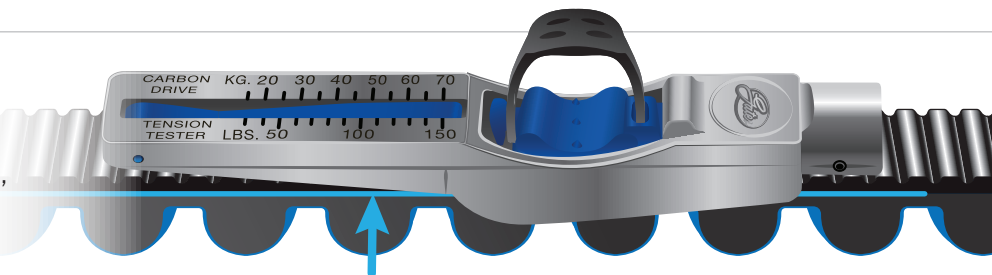
1

Verify Indicator Arm is positioned completely down. Place index finger in the rubber Finger Strap, on top of the Click Pad, as shown.



2

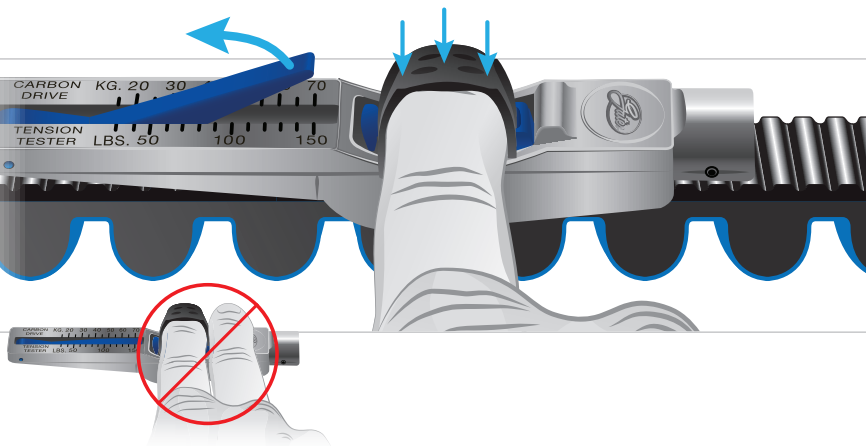
Place Kriket Gauge on top of the belt and position the gauge in the middle of the total belt span, making sure the Gauge Lip sits flush against the belt.



3

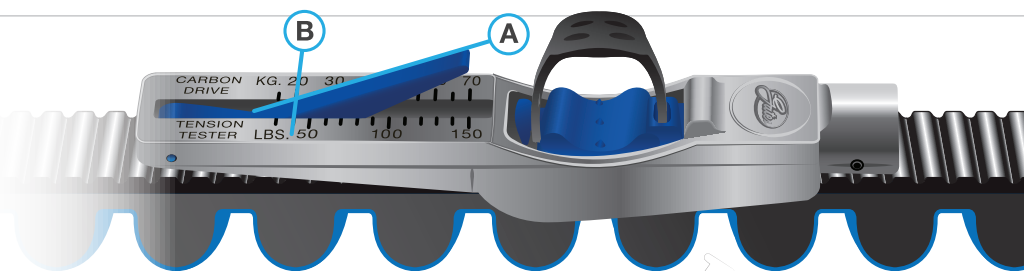
Press down on tester click pad until it clicks. It is critical to use only one finger on the gauge.

WARNING: Do not touch the Kriket gauge with a second finger. This process is a one finger operation.



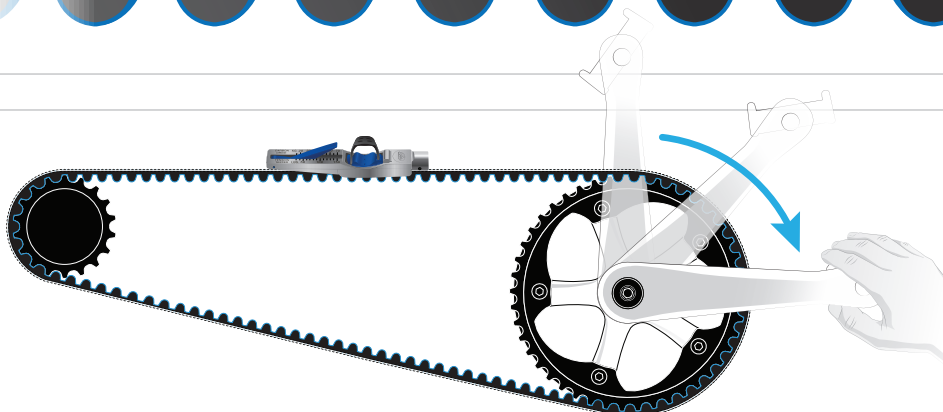
4

Measurement point is the intersection of lines A and B. The gauge tension reading shown is: **20 KG (40 LB)**



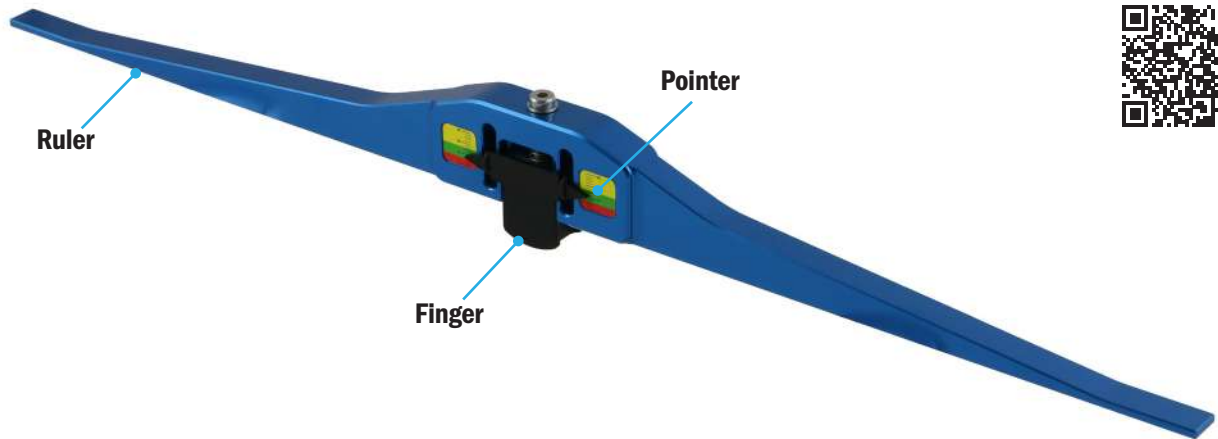
5

Rotate crank one-quarter turn and repeat previous steps 1 to 4. Repeat rotation and measurement no fewer than 3 times.



TOOLS: PROFESSIONAL BELT TENSION GAUGE

Available through Universal Transmissions



Reset the pointer to zero.

Note: Pointer must be reset before each measurement.



Contacting both sprockets, measure the belt tension across the span.



Too much belt tension



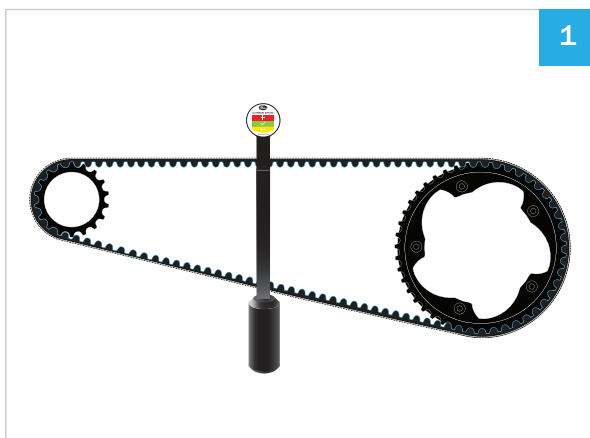
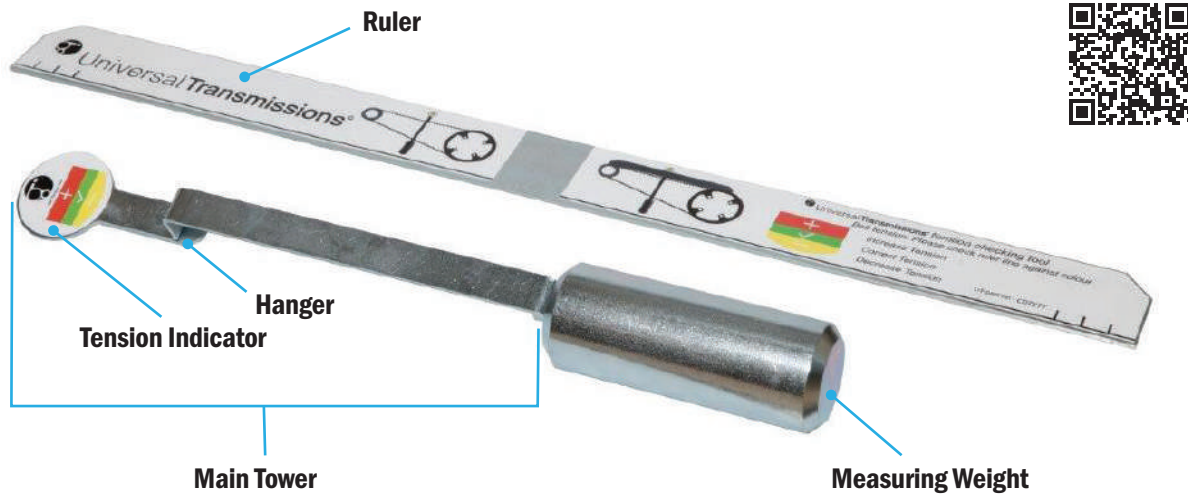
Optimal belt tension



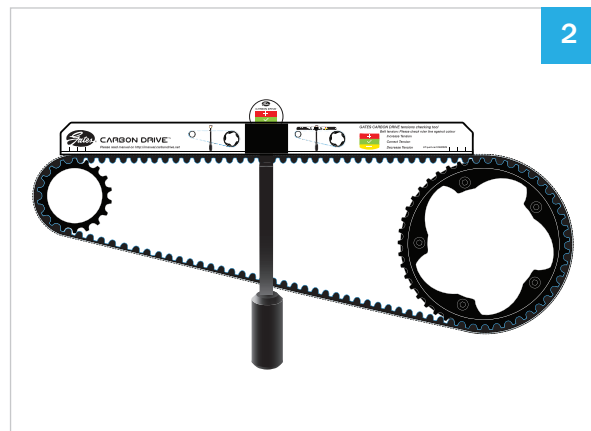
Too little belt tension

TOOLS: ECO TENSION TESTER

Available through Universal Transmissions



Hang the main tower on the belt.



Put the ruler on the two sprockets. Check the tension:

+	Red	Increase the tension
✓	Green	Tension is good
-	Yellow	Decrease the tension

TOOLS: FREQUENCY GAUGES

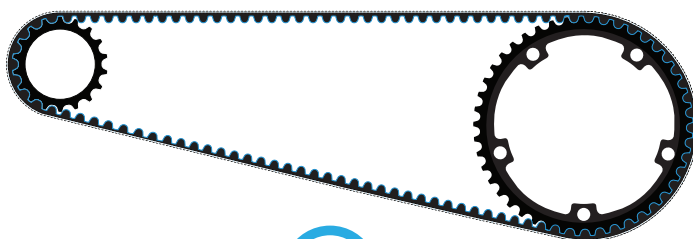
GATES CARBON DRIVE MOBILE APP

[FOR IPHONE & ANDROID]

Gates Carbon Drive Mobile App measures belt tension from the natural frequency (Hz) of the belt span. Using the microphone, the App converts the sound into the primary frequency of the belt.

From the App, click the Tension icon and then click Measure. Hold the device microphone (be sure microphone is 'on') facing the belt. Pluck the belt so that it vibrates similar to a guitar string. Rotate the crank $\frac{1}{4}$ turn and repeat the frequency measurement. Compare your belt's frequency to the chart in the app to review any necessary tension adjustments. The Gates Carbon Drive Mobile App works best in a quiet environment.

- Find key parameters of your drive such as speed ratio and center distance
- Change belt length or sprocket sizes to better suit your riding needs
- Compare two belt drive bikes to each other
- Check out what sprocket sizes, mounting options, and belt lengths are available in our catalog
- Check tension with our frequency measuring tool



SONIC TENSION METER

The Gates Sonic Tension Meter measures belt tension by analyzing the harmonic characteristics of a vibrating belt. Simply pluck the belt like a guitar string and the meter will take a reading and provide a highly accurate tension measurement.

COMPACT SIZE

- About the size of a cellphone, the Sonic Tension Meter can easily be operated by one person for fast, accurate readings

Note: Perfect for factory installation.



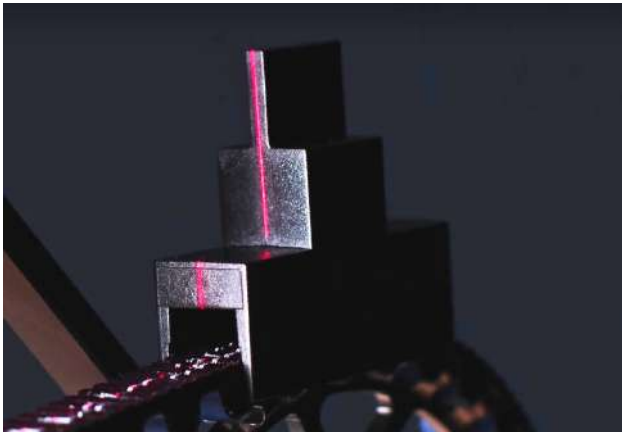
Product No 7420-0550

LASER ALIGNMENT TOOL

Quickly check sprocket alignment with the Laser Alignment Tool. Simply place the measuring unit on the belt or sprocket and alignment can be read within seconds. The fast and professional solution for every workshop.



Available through Universal Transmissions.



GATES PROFESSIONAL ALIGNMENT TOOL

Simply and accurately measures frame alignment and supports factories in the production and quality control of new frames.



Product No 7468-0998

TOOLS: SPROCKET TOOLS

GATES SPROCKET WRENCH

The Gates Sprocket Wrench is recommended for removing the rear sprocket. Be sure to follow all handling instructions for removing the Gates Carbon Drive belt: Do not crimp, twist, backbend, invert, bundle or zip tie the Carbon Drive belt. Do not use the Carbon Drive belt as a strap wrench or chainwhip. Do not roll or pry on the Carbon Drive belt.

Gates product # 7468-0007



**DO NOT USE BELT AS A
SPROCKET REMOVAL TOOL**



SUREFIT™ INSTALLATION TOOLS

Aids in the installation of Shimano and enviolo SureFit sprockets.

XU, XL, EV sprocket types:
Gates product #7468-0999



AFMN SPROCKET REMOVAL TOOL

Aids in the removal of Sturmey-Archer threaded sprockets.

Gates product #7468-0997



ADDITIONAL ONLINE RESOURCES

EBIKE CONFIGURATOR AND SANITY

Online calculators useful for product managers. Visit GatesSanityCheck.com



EBIKE CONFIGURATOR

Welcome to the Gates Online Belt/Sprocket configurator for eBike mid-drive systems. This tool is useful for product managers to quickly choose their motor and hub, and determine available sprockets for these configurations and beltlines.

Motor	Bolts	Guard	Rear Hub	Front Sprocket	Beltline	Motor Offset	Rear Sprocket	Part Family
Bosch Gen3	4	No	enviolo TR, SP, CA (135/142mm)	39	45.5	-6.0	19	CDX
Bosch Gen4	5	Yes	Rohloff SpeedHUB 500/14 (135/142mm)	42	54.7	0.0	20	CDC
Brose G1/G2			Shimano Inter-SE (Mechanical)	46	48.7	-3.5	22	
Panasonic GX			Shimano Nexus 7/8 Disc, Aline 8/11 (Mechanical)	48	41.7	-3.0	24	
Shimano STEPS E5000			enviolo SP, CA (148mm)	50	51.7		26	
Shimano STEPS E6100			Shimano Inter-SE (D12)	55			28	
Shimano STEPS EP8			Shimano Nexus 8; Aline 8/11 (D12)	60			30	
Yamaha PW Series ST, TE			enviolo CT, TR, SP, CA, CO (135/142mm)	63			32	
			Rohloff SpeedHUB 500/14 (148mm)				34	
							36	

Calculate

Clear

Motor	Bolts	Guard	Rear Hub	Front Sprocket	Beltline	Motor Offset	Rear Sprocket	Part Family	Front BOM	Front COO	Rear BOM	Rear COO

DRIVE TRAIN SANITY CHECK

You've designed a belt drive compatible frame, now is the opportunity to "sanity check" your spec to ensure it makes sense for the bicycle you intend to bring to market.

- Input your application parameters, then choose the low and high cadence values that will be used to calculate corresponding bicycle speeds for your hub choice and it's gearing limits.
- Hit the CALCULATE button and the chart below will complete.
- Change parameters as needed and your additional calculations will be added to the chart.
- You can generate as many rows of results as you wish and use the email field below to have the data emailed to you as a convenient CSV File (your information will not be used for any other purpose).
- To completely start over, use the RESET button.

Additional options include:

- Compare your results to a standard bicycle
- Center Distance Calculator

Wheel Size	Tire Size	Crank Size	Hub / Gearbox	Front Sprocket	Rear Sprocket	Low Cadence	High Cadence
36inch	20 mm	160.0	Rohloff	Bosch G2 22T	19	30	30
32inch	23 mm	162.5	Kindernay 7	Bosch G2 24T	20	31	31
28inch	25 mm	165.0	Kindernay 14	Bosch G2 26T	21	32	32
27inch	26 mm	167.5	Nexus 3	Bosch G2 28T	22	33	33
700c/29er	27 mm	170.0	Nexus 7	Pinion 32T	23	34	34
650b/27.5	28 mm	172.5	Nexus/Aline 8	39T	24	35	35
650c	30 mm	175.0	Nexus/Aline 11	42T	26	36	36

Calculate

Clear

W Size	T Size	Crank Size	Hub / Gearbox	Front S	Rear S	Cadence L	Cadence H	V low kph	V high kph	V low mph	V high mph

WE'VE COLLECTED INFORMATIVE RESOURCES FOR YOU IN ONE CONVENIENT PLACE

OWNER'S MANUAL

HISTORY

PRODUCT LINES

APPLICATIONS

COMPONENTS

ASSEMBLIES

TECHNICAL RESOURCES



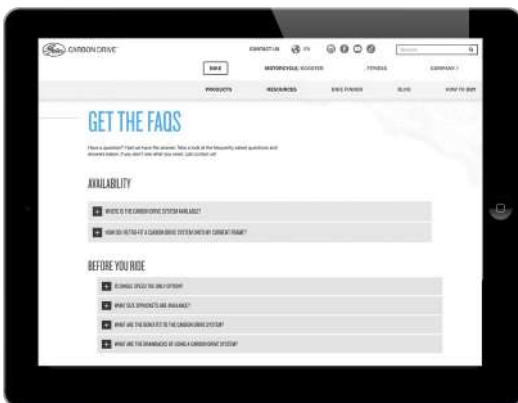
INSTRUCTIONAL VIDEOS

Check tension, repair flats with internal hubs, and more – short videos for mechanics and riders.



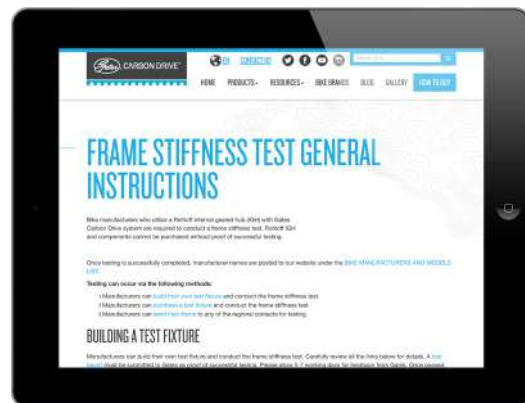
TECHNICAL BULLETINS

Updates with component specific instructions and information from our Engineering team.



FAQS

Have a question?
I bet we have the answer.

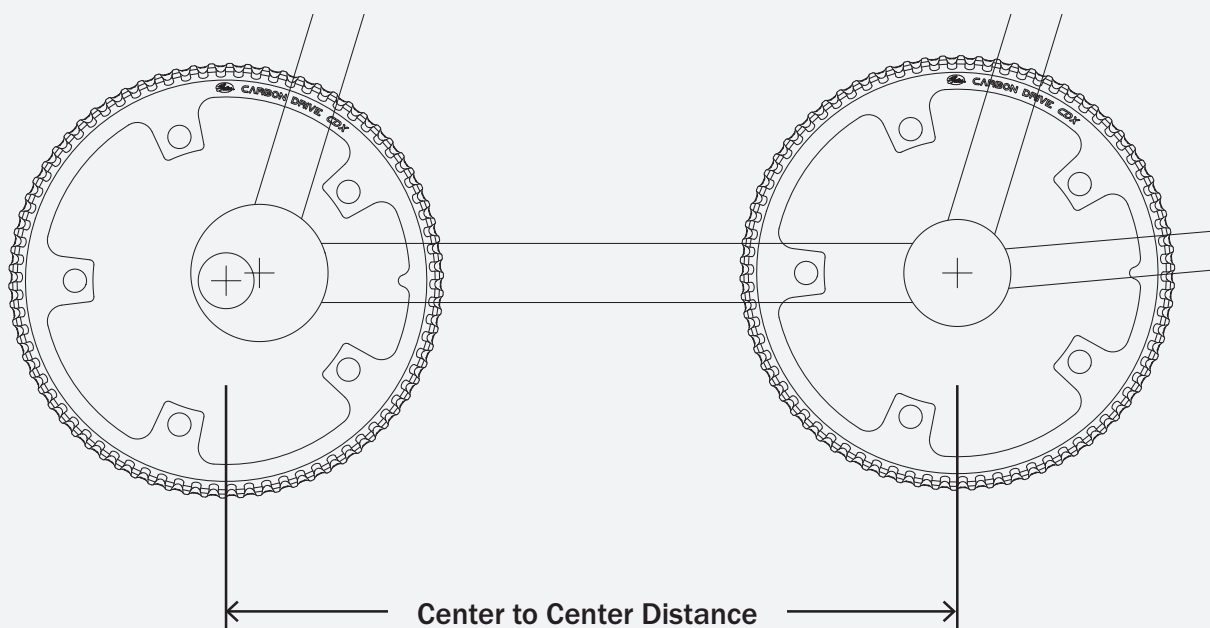


FRAME STIFFNESS TESTING

The stiffness or a frame's rear triangle plays a major role in the performance of the belt drive system. For bike manufacturers, Gates offers frame stiffness testing to ensure frames meet requirements. Bicycles with Rohloff hubs in particular, have specific frame stiffness requirements. For more information, email CarbonDrive@Gates.com



TANDEM STOKER DRIVES



The Gates Carbon Drive tandem stoker drive saves a significant amount of weight, reduces maintenance, and lasts longer than an equivalent chain stoker drive; and because the frame does not require a break to use the belt, the system can be retrofitted. However, it is important to note that its use is limited to frames that meet the center distance requirements. There are multiple center distance options for fitment of the stoker drive in both 8mm and 11mm configurations. Riders should choose the combination of belt and sprockets that best matches their frame's measured dimensions between captain and stoker bottom brackets.

CDX-Center Track sprockets require more installation room – or installation of sprockets after belt has been installed.

To retrofit the drive, there needs to be enough room to both install the drive,

and to tension it. Two measurements will need to be taken, the first at the minimum center distance (where the EBB is closest to the standard BB), and at the maximum center distance (where the EBB is furthest from the standard BB). There is not a lot of adjustment with an eccentric bottom bracket, so careful measurement is necessary. The following chart identifies the Install Distance, Center to Center Distance, and Recommended Total Travel of all options. Riders should choose one row of the chart for their frame and use the listed sprockets and belt size. To ensure the drive will fit, the minimum center distance measured must be less than the Install Center Distance, and the maximum center distance measured must be more than the Recommended Total Travel. If you have any questions about fitment, please contact us for assistance.

11mm CDX TANDEM STOKER DRIVE

SPROCKET TEETH	BELT	PITCH	MOUNTING TYPE	INSTALL DISTANCE	CENTER TO CENTER DISTANCE	RECOMMENDED TOTAL TRAVEL
46	160	11	4-Bolt/5-Bolt	623.30	627.30	630.30
42	160	11	4-Bolt	645.01	649.01	652.01
46	166	11	4-Bolt/5-Bolt	656.30	660.30	663.30
39	160	11	4-Bolt	661.30	665.30	668.30
46	168	11	4-Bolt/5-Bolt	667.30	671.30	674.30
42	166	11	4-Bolt	678.01	682.01	685.01
42	168	11	4-Bolt	689.01	693.01	696.01
39	166	11	4-Bolt	694.30	698.30	701.30
46	174	11	4-Bolt/5-Bolt	700.30	704.30	707.30
39	168	11	4-Bolt	705.30	709.30	712.30
46	177	11	4-Bolt/5-Bolt	716.80	720.80	723.80
42	174	11	4-Bolt	722.01	726.01	729.01
46	178	11	4-Bolt/5-Bolt	722.30	726.30	729.30
39	174	11	4-Bolt	738.30	742.30	745.30
42	177	11	4-Bolt	738.51	742.51	745.51
46	181	11	4-Bolt/5-Bolt	738.80	742.80	745.80
42	178	11	4-Bolt	744.01	748.01	751.01
46	183	11	4-Bolt/5-Bolt	749.80	753.80	756.80
39	177	11	4-Bolt	754.80	758.80	761.80
39	178	11	4-Bolt	760.30	764.30	767.30
42	181	11	4-Bolt	760.51	764.51	767.51
42	183	11	4-Bolt	771.51	775.51	778.51
39	181	11	4-Bolt	776.80	780.80	783.80
39	183	11	4-Bolt	787.80	791.80	794.80

8mm CDX TANDEM STOKER DRIVE

SPROCKET TEETH	BELT	PITCH		INSTALL DISTANCE	CENTER TO CENTER DISTANCE	RECOMMENDED TOTAL TRAVEL
74	250	8	5-Bolt	700.86	704.86	707.86
69	250	8	5-Bolt	720.60	724.60	727.60
66	250	8	5-Bolt	732.44	736.44	739.44

TROUBLESHOOTING

OWNER'S MANUAL

HISTORY

PRODUCT LINES

APPLICATIONS

COMPONENTS

ASSEMBLIES

TECHNICAL RESOURCES

SYMPTOM: BELT RUNNING OFF SPROCKETS

POSSIBLE CAUSES	CORRECTIVE ACTION
Mis-alignment of the drive system	- Check alignment of rear wheel - Check to make sure sprockets are properly aligned - Verify the correct amount of spacers have been used for the rear sprocket - Check to make sure the belt is not being pinched between sprocket flanges - Realign drive system and tension belt
Improper belt tension	- Check to see if the rear wheel, eccentric bottom bracket, or dropout has moved - Check to see if the tensioning device has been affected - Reposition rear wheel in dropouts - Re-tension the belt and measure using an approved tool
Rear wheel has moved in dropout or sliding dropout has moved	- Reposition rear wheel in dropouts - Re-tension the belt
Eccentric bottom bracket has moved	- Loosen eccentric bottom bracket mechanism - Align front and rear sprockets - Re-tension system
Chainring bolts coming loose	Tighten chainring bolts
Cassette lockring or snap ring coming loose	- Tighten cassette lockring - Verify correct number of spacers
Excessive mud or debris in the drive system	- Clean mud or debris from the drive system - Belts that have been derailed may have been damaged, and should be replaced
System damaged or worn	Inspect sprockets and belt and replace if needed

SYMPTOM: BELT TOOTH JUMPING ON SPROCKETS

POSSIBLE CAUSES	CORRECTIVE ACTION
Improper belt tension	Adjust tension and measure using an approved tool
Belt system has lost its tension	- Check to see if the rear wheel, eccentric bottom bracket, or dropout has moved - Check to see if the tensioning device has been affected - Reposition rear wheel in the dropouts - Re-tension the belt and measure using an approved tool
Rear wheel or sliding dropout has moved	- Reposition rear wheel in dropouts - Re-tension the belt
Eccentric bottom bracket has moved	- Loosen eccentric bottom bracket mechanism - Align front and rear sprockets - Re-tension system
System damaged or worn	Inspect sprockets and belt and replace if needed

SYMPTOM: BELT TOOTH WEAR

POSSIBLE CAUSES	CORRECTIVE ACTION
Excessive debris in drive system	■ Clean any debris from sprocket and belt
Improper belt tension	■ Check to see if the tensioning device (sliding dropout, eccentric bottom bracket) has been affected ■ Reposition rear wheel in dropouts ■ Re-tension the belt and measure using an approved tool
Mis-alignment of the drive system	■ Check to make sure the sprockets are properly aligned ■ Verify the correct amount of spacers have been used for the rear sprocket ■ Check to make sure the belt is not being pinched between the sprocket flanges ■ Realign drive system and tension belt, measure using an approved tool
Worn sprocket	■ Replace sprocket
Damaged sprocket teeth	■ Replace sprocket
Sprocket flange damage	■ Replace sprocket
Worn or damaged belt	■ Replace belt

SYMPTOM: BELT SQUEAKING

POSSIBLE CAUSES	CORRECTIVE ACTION
Mis-alignment of the drive system	■ Check to make sure sprockets are properly aligned ■ Verify the correct amount of spacers have been used for the rear sprockets ■ Check to make sure the belt is not being pinched between the sprocket flange ■ Realign drive system and tension belt, measure using an approved tool
Improper belt tension	■ Check to see if the rear wheel, eccentric bottom bracket, or dropout has moved ■ Check to see if the tensioning device has been affected ■ Reposition rear wheel in dropouts ■ Re-tension the belt and measure using an approved tool
Bent sprocket flange	■ Replace sprocket
Worn sprocket	■ Replace sprocket
Chainring bolts coming loose	■ Tighten chainring bolts
Dry, dusty conditions	■ Clean entire drive train with soap and water; allow to dry completely ■ Applying dry silicon to a clean belt can help

TROUBLESHOOTING

OWNER'S MANUAL

HISTORY

PRODUCT LINES

APPLICATIONS

COMPONENTS

ASSEMBLIES

TECHNICAL RESOURCES

SYMPTOM: BROKEN BELT

POSSIBLE CAUSES	CORRECTIVE ACTION
Improper belt handling, storage or installation	- Follow Owner's Manual belt handling instructions and installation tips gatescarbondrive.com/ownersmanual - Never roll or pry belt onto sprockets - Replace belt
Debris or object in drive system	- Clean debris from sprocket - Replace belt
Belt ran off rear sprocket	- Your belt could be damaged. A new belt is recommended. - Check to make sure sprockets are properly aligned - Verify the correct amount of spacers have been used for the rear sprocket - Realign drive system and tension belt
Stripped Teeth, Root Cracking or Worn Belt	Replace belt

SYMPTOM: CLICKING

Tolerance Issue with 3-Lobe Sprocket	- Replace with current version SureFit sprocket - Examine hub body for damage/excessive wear
Chainring bolts coming loose	Tighten chainring bolts

SYMPTOM: TENSION LOSS IN DRIVE SYSTEM

Change in distance between sprockets	- Check to see if the rear wheel or dropout has moved - Check to see if the tensioning device has been affected - Reposition rear wheel in dropouts - Re-tension the belt and measure using an approved tool
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SYMPTOM: TENSION READINGS Excessive variation of tension readings in the belt after proper installation

Non-concentric assembly of sprocket/crank arm	- Loosen chainring bolts and center sprocket on crank arm tabs - Re-tighten chainring bolts
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Axial Crank Run-Out

The amount of right to left crank arm tab movement relative to the centerline of the frame when rotating the cranks. Also referred to as wobble.

Belt Alignment

Refers to the parallel (side to side) and angular (toe in - toe out) alignment of the belt.

Belt Frequency

A term used in tensioning the belt. The natural frequency of a belt depends on the tension inside of the belt and distance between sprockets; the higher the tension the higher the frequency. Measurement of the belt frequency requires the Gates Carbon Drive Tensioning app or the Gates Sonic Tension Meter.

Belt Installation Distance

The minimum distance between center of the bottom bracket and rear axle needed to install the belt on the sprockets loosely. Initial installation of the belt loosely on the sprockets is required in order to avoid damaging the belt.

Beltline

The distance from the centerline on the belt in relation to the centerline of the frame.

Belt Pitch

The distance from the center of one tooth to the center of the next tooth. This measurement is different than a chain.

Belt Tension

The amount of tension experienced inside of a loaded belt. Belts require correct tensioning. Proper installation tension keeps the belt from jumping teeth and increases the life of the belt.

Center Distance

The distance from center of the bottom bracket to center of the rear axle.

Eco Tension Tester

A tool used to set proper belt tension.

Flange

Sprocket feature that guides the belt.

Frame Break

A feature of the frame enabling a split or gap in the frame structure allowing belt installation into the rear triangle. Unlike a chain, a belt is continuous and cannot be broken and reconnected, therefore a separation in the frame is required for belt installation.

Frame Stiffness

Refers to a frame's resistance to flex for a given load applied. Stiffness plays a vital role in the operation of a belt drive. Too much flex can cause tooth jump, mis-alignment, noise, and wear.

Gear Inches

A system of measurement used to compare gear ratios based on the distance a bike travels with one pedal rotation.

Guard

An optional protective component to meet ISO 4210 requirements.

Krikkit Gauge

A handheld tool used to set proper belt tension.

OLD

Over locknut dimension - the distance between the hub locknuts that mate to the bicycle dropout.

Profile

Refers to the shape of the belt tooth and sprocket groove.

Radial Crank Run-Out

The amount of "out-of-roundness" of crank arm tabs when rotating the cranks. Also referred to as Eccentricity. This type of run out is usually detected through tension variations in the belt leading to tight and loose spots in the belt.

Snubber

A device typically used on Rohloff drivetrains to increase belt wrap on the rear sprocket to help prevent the belt from skipping. A typical place for a snubber would be on the entry point of the belt into the rear sprocket (slack side).

Sonic Tension Meter

High precision electronic tool typically used by factories to set proper belt tension.

Sprocket

Using belt drive terminology, the term sprocket is used in place of rear cog and front chainring.

Sprocket Clearance

Distance from the closest edge of a front or rear sprocket to the frame. Belt drive sprockets are wider than chain rings, so clearance requirements must be considered.

Sprocket Wrench

A tool used to hold the rear sprocket in order to remove the rear cassette lockring. A sprocket wrench is the equivalent of a chain whip used for removing cogs on standard chain drive systems. Never use the Carbon Drive belt as a sprocket wrench.

Synchronous

Refers to drive systems using toothed belts in mesh with grooved sprockets.

Tensioned Center Distance

The distance between the center of the front sprocket and rear sprocket at proper belt tension for a given drive ratio.

Tooth Jump

Occurs when the belt tooth misses an engagement with a sprocket groove. This is typically due to incorrect belt tension.

Tooth Outer Diameter

The outermost diameter (OD) of the sprocket teeth.

CONTACTS

OWNER'S MANUAL

HISTORY

PRODUCT LINES

APPLICATIONS

COMPONENTS

ASSEMBLIES

TECHNICAL RESOURCES



AMERICAS

303-744-4755

CarbonDrive@Gates.com



EUROPE

+49 (0) 3601 888 6484

info@CarbonDrive.net

ASIA OE

04-2301-6876 (from Taiwan)

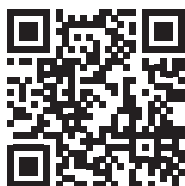
+886-4-2301-6876

(from any Int'l location)

CarbonDrive.tw@Gates.com

FOR OTHER LOCAL CONTACTS, VISIT WWW.GATESCARBONDRIVE.COM/OEM-FACTORY

Warranty submission form at:
GatesCarbonDrive.com/Warranty



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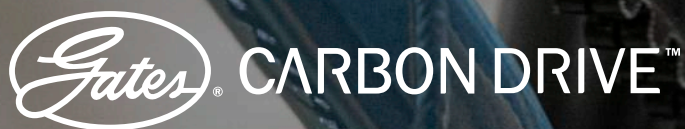
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GATES CORPORATION

CarbonDrive@gates.com

www.GatesCarbonDrive.com



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