



Speed Stop Pro Brake

Service Information

Speed Stop Pro BRAKE INSTALLATION AND ADJUSTMENT

These instructions explain the unique installation and adjustment requirements of the 2014 Speed Stop Pro brakes.

In addition to standard features such as an easy-to-use barrel adjuster, centering mechanism, and lever-operated brake quick-release (Figure 1), the Speed Stop Pro brake offers a unique power adjustment. This adjustment allows riders to personalize the feel and performance of their brakes.

These instructions are written for an experienced mechanic, so they do not explain basic assembly or procedures that might be critical to the product or the safety of the rider. If you need further assistance, consult a mechanic's manual or contact Trek Customer Service.

NOTE: Avoid over-stretching springs prior to installation; cable installation and adjustments with rims in place will reduce risk of spring damage.

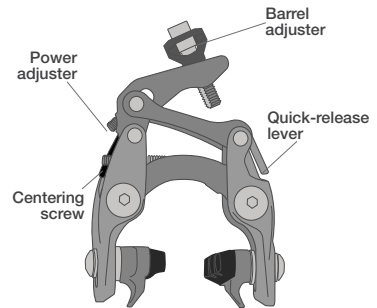


Figure 1. Speed Stop Pro brake features

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TOOLS AND MATERIAL NEEDED

- Brake, cable, and housing
- Cable end and crimping tool
- Torque wrench
- Allen or hex wrenches: 2.5, 3, 5mm
- Light oil or grease
- Calipers (for measuring rim width)
- Threadlocker (Loctite® 242 is excellent)

INSTALLATION

Attachment

The new Speed Stop Pro integrated brakes use the direct mount standard. Instead of pivoting on a bracket mounted to the frame with a single bolt, the brake arms pivot on their mounting screws. The screws thread directly into the fork and the seatstays of the frame (Figure 2), reducing weight and increasing braking efficiency.

When attaching the front or rear brake, do not overtighten. See the torque specifications on page 20.

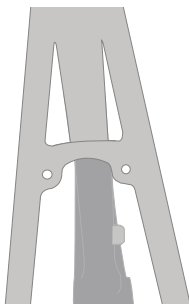


Figure 2. Rear brake placement, direct mount

Cable routing: Front brake

The brake cable passes through the brake, between the link arms (see illustrations of cutaway brake, Figures 3 and 4). The cable is secured by a set screw as shown in Figure 4 below. The finished cable should be long enough to rest against the outside of the brake pad holder (Figure 4).

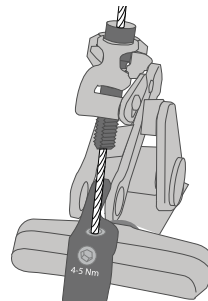


Figure 3. Cutaway side view: cable route through brake

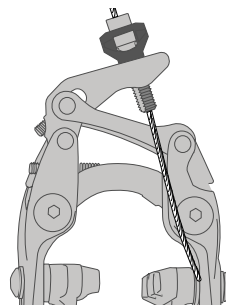


Figure 4. Cutaway of brake: cable route

Cable routing: Rear brake

1. Thread the cable through the rear brake lever and the housing that runs to the head tube.
2. Cut the rear housing to length (Figure 5).

If the housing is too short, it will pull against the seat tube and reduce brake function. If the housing is too long, it might contact the rider's leg. Use brake housing ferrules on all housing ends.

3. Thread the cable through the housing stop on the head tube, then out the top tube to the brake.
4. Pass the cable through brake, and secure it with the cable clamp bolt.
5. Follow normal adjustment procedures.

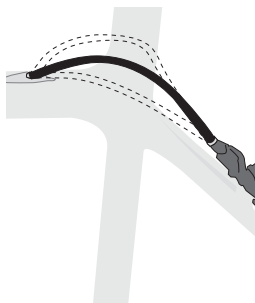


Figure 5. Correct (and incorrect) rear housing length

ADJUSTMENT

Centering

The centering screw (Figure 6) centers the brake.

The centering screw is held in place with thread locker. See the last section, Bolt Preparation, for use of threadlocker.

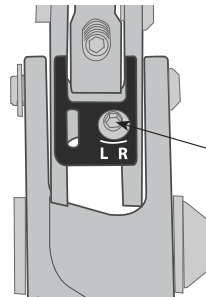


Figure 6. Centering screw

Note: The brake quick-release is intended to be an "open/close" mechanism to allow the tire to pass during a wheel change, and should not be placed between these positions to adjust pad spacing.

Rim Spacing

Bontrager Speed Stop Pro brakes can be set up to accommodate a range of rim widths by adjusting both the spacer placement and power setting of the brake. The 1[mm] spacers are originally located on the inside between the brake arms and spherical washers(as shown in Figure 7). For rim widths 25[mm] or greater, these washers can be moved to the outside of the brake, between pad holder washer and brake arm, or removed entirely.

Narrow Carbon Rims

Thicker SwissStop Black Prince FlashPro pads, or equivalent, are recommended for carbon rims of 22[mm] widths or less. Spacers should be located on the inside of the brake arms. Braking power is also a function of rim width, and the brakes will be more powerful at especially narrow rim widths. Decreasing the power by adjusting the power screw in will provide additional lever throw.

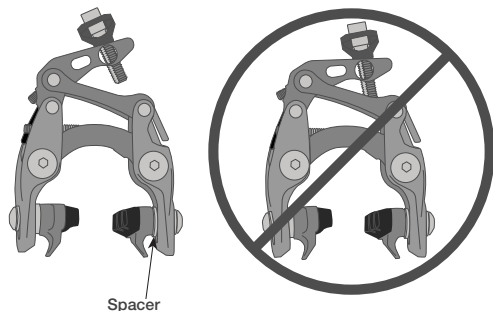


Figure 7. Spacer between spherical washer and arm

Rim Width [mm]	Spacer Location/notes
20-24	Inside, between spherical washer and arm
25-28	Outside, between brake pad holder washer and arm

Power

The braking force at the rim, or power, is a function of cable pull and leverage.

For an explanation of power, see the following section.

To change the power of your brake, turn the adjustment screw (Figure 8). As indicated by the +/- sign, turning

the screw clockwise (right) decreases the power. Turning the screw counterclockwise increases the brake power.

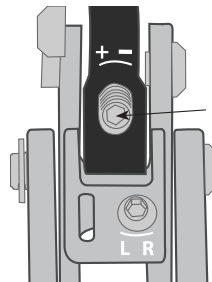


Figure 8. Power adjustment screw

Note: Do not remove the adjusting screw.

Table of power settings for brake brand

Brake brand	Leverage ratio	Power setting (turns out from fully in)
Fully in	1.3	0
SRAM	1.55	3
Shimano	1.85	6
Fully out	2.0	7

Note: Leverage ratios are approximate and for comparison only

AN EXPLANATION OF POWER

Levers (and fulcrums)

A lever is a beam connected to a fulcrum (Figure 9). If the fulcrum is placed away from the center of the beam, it allows a small force to move a big force. As the beam pivots on the fulcrum, the ends of the beam move at different rates, proportional to their distances from the fulcrum.

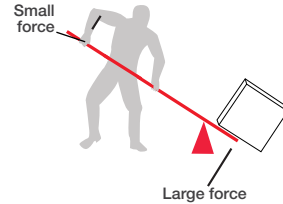


Figure 9. Lever and fulcrum

Levers and brakes

In the case of a brake lever, a small force applied by your hand applies a larger force to the cable (Figure 10).

The high force of the cable is a benefit because the greater force better overcomes the small frictional forces of the cable. That means more force is transmitted to the brake. When the cable force gets to the brake, the force again meets a lever (Figure 11). And that lever works across another fulcrum, causing the brake pads to apply force to the rim.

By using this system of levers, the small force from a couple of fingers can stop the large force of you riding down a hill. To optimize the system, each beam must compromise its length and fulcrum position, and within the physical constraints of the system: your fingers are only so long (the brake levers must accommodate the size of your hands), there is only so much room for the brake (the brake must fit in a small area on the frame and meet the rim correctly), etc.

However, there is some adjustment possible to the length of these beam/fulcrum systems. Shimano and SRAM have each designed slight differences in their systems, such that a Shimano brake lever should be used only with a Shimano brake, and the SRAM system has a similar constraint. To put it plainly, the levers from each company pull a different amount of cable; this is a result of a different position of the fulcrum on the beam. And the brakes of each company are designed to match.

The more the fulcrum is moved toward one end of the beam (or the force is moved), the greater the difference in input force and output force (Figure 12). And the greater the movement required at the other end of the beam.

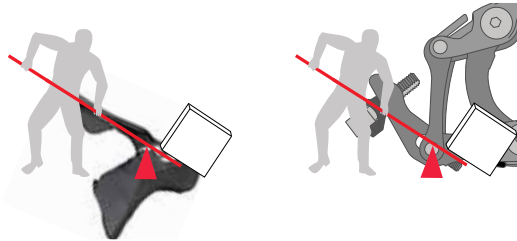


Figure 10. Lever and fulcrum in brake lever

Figure 11. Lever and fulcrum in brake lever

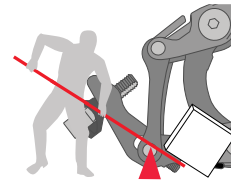


Figure 12. Different distances from fulcrum

High power

A brake system that requires more movement of the lever to contact the rim (high power) tends to feel "soft" because it requires less force from your fingers for a given force at the rim (Figure 13). This is sometimes referred to as 'modulation' because with less force, you feel like you have more control.

A high power system requires more movement of the brake lever for the pads to contact the rim, so the total power may be limited by the proximity of the lever to the handlebar.

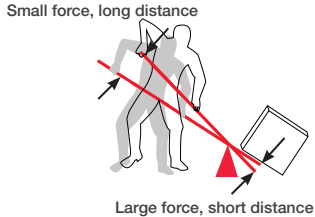


Figure 13. Ratio of force versus distance

Low power

A system requiring less lever movement to contact the rim (low power) will feel "stiffer" at the brake lever, but the total force available at the rim will be lower. Lower power in the rear brake can be an advantage because it allows a wider range of force by your hand before locking up the rear wheel.

One additional factor to consider is the effect of rim width on the braking system. When the brake is opened up or the pads moved to accommodate a wider rim, the application of force across the fulcrum changes. The Speed Stop Pro brake has less power when used with wider rims, but the power can be increased to match the output of other popular brands.

Which is better: low or high power?

Within the available range of power, it simply boils down to personal preference.

Other benefits

On most bikes, it is usual for the front and rear brakes to feel different. This is due to the flex and compression of the cable system. The power adjustment allows you to compensate for this flex and compression and thus match the feel for both front and rear brakes.

If you change rim width on your bike, such as commonly occurs when switching from an aluminum rim to a carbon one, the leverage of the brakes will change because the brake arms are adjusted outwards. The Speed Stop Pro brakes allow you to tune the leverage ratio for a consistent feel, regardless of rim width.

Speed Stop Pro brakes

The Speed Stop Pro is a unique brake that allows an adjustment of the power (Figure 14).

Because the brake and brake lever work together as a system, adjusting the brake power affects the feel at the lever. Trek's new brake design allows you to custom-tune the braking power to your preference, regardless of the brake levers you use, the length of cable and housing, or the rim widths you choose.

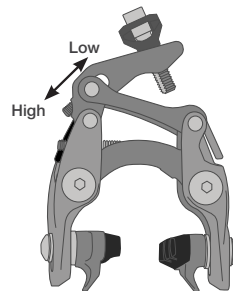


Figure 14. Changing fulcrum changes power

For more technical information, visit www.bontrager.com

ADDITIONAL INFORMATION

Parts List

This section shows the part numbers and descriptors of replacement parts available for the Speed Stop Pro brakes (Figure 15).

Reference	Part	Part number
1	Spring	
2	Barrel	
3	Barrel adjuster	
4	Power screw	Contained in Kit W568434
5	Brake pad holder bolt (pair)	W507767
6	Brake pad holder washer (pair)	
7	Spacer, 1mm (pair)	
8	Spherical washer (pair)	
9	Brake pad carrier assembly, non-drive side	
10	Brake pad (pair)	
11	Pad retention screw (pair)	
12	Brake pad carrier assembly, drive side	
	Complete brake	550765
	Brake Bolt Hardware Kit Includes power screw, centering screw and cable clamp set screw.	W568434

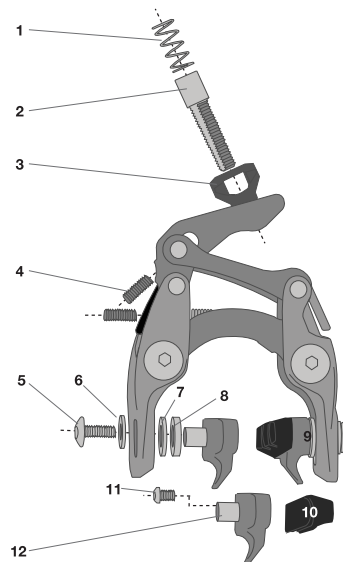


Figure 15. Exploded diagram

Torque specifications

Bolt or screw	Torque (Nm)
Attachment (to bike) bolts	6–8
Cable clamp bolt	4–5
Brake pad holder bolts	4–5

Bolt preparation

This section explains how to prepare or maintain the threaded fasteners of the Speed Stop Pro brake before and after adjustments.

Threadlocker:

If a centering screw or power adjustment screw is adjusted repeatedly, it could lose its thread locker and thus lose adjustment. Re-apply thread locker as needed.



About this Manual

This is the manual for your Speed Stop Pro Brake.
Check for updates at bontrager.com.