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

The new Speed Stop integrated brakes use a dual-pivot design. 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 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.

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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)
Attachment
The new Speed Stop integrated brakes use a dual-pivot design, but 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 6.

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 wedge clamp that is secure without crimping any cable strands. The finished cable should be long enough to rest against the outside of the brake pad holder (Figure 4).

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.
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.

Rim spacing
Some riders will want to use both standard-width rims and wider rims. To accommodate different rim widths, simply move the 1mm spacer from the inside or outside of the brake arm (see Figure 7, and the Table below).

Table of spacer locations for rim widths

<table>
<thead>
<tr>
<th>Rim width (mm)</th>
<th>Location of 1mm spacer</th>
</tr>
</thead>
<tbody>
<tr>
<td>19-23</td>
<td>Inside, between spherical washer and arm</td>
</tr>
<tr>
<td>Tune rim</td>
<td>Inside, between spherical washer and arm</td>
</tr>
<tr>
<td>24-27</td>
<td>Outside, between brake pad holder washer and arm</td>
</tr>
</tbody>
</table>

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.

Table of power settings for brake brand

<table>
<thead>
<tr>
<th>Brake brand</th>
<th>Leverage ratio</th>
<th>Power setting (turns out from fully in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully in</td>
<td>1.3</td>
<td>0</td>
</tr>
<tr>
<td>SRAM</td>
<td>1.55</td>
<td>3</td>
</tr>
<tr>
<td>Shimano</td>
<td>1.85</td>
<td>6</td>
</tr>
<tr>
<td>Fully out</td>
<td>2.0</td>
<td>7</td>
</tr>
</tbody>
</table>

Note: Leverage ratios are approximate and for comparison only.
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.

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 constrains 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.

(continued next page)
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.

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 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 brakes allow you to tune the leverage ratio for a consistent feel, regardless of rim width.

Speed Stop brakes
The Speed Stop 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.

For more technical information, visit www.bontrager.com
Parts List
This section shows the part numbers and descriptors of replacement parts available for the Speed Stop brakes (Figure 15).

<table>
<thead>
<tr>
<th>Reference #</th>
<th>Part</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Spring</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Barrel</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Barrel adjuster</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Power screw</td>
<td>W507768</td>
</tr>
<tr>
<td>5</td>
<td>Centering screw</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Cable clamp bolt</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Cable clamp wedge</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Brake pad holder bolt (pair)</td>
<td>W507767</td>
</tr>
<tr>
<td>9</td>
<td>Brake pad holder washer (pair)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Spacer, 1mm (pair)</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Spherical washer (pair)</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Brake pad carrier assembly, non-drive side</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Brake pad carrier assembly, drive side</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Brake pads (pair)</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Pad retention screw (pair)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complete brake</td>
<td>W327102</td>
</tr>
</tbody>
</table>

Torque specifications

<table>
<thead>
<tr>
<th>Bolt or screw</th>
<th>Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attachment (to bike) bolts</td>
<td>6-8</td>
</tr>
<tr>
<td>Cable clamp bolt</td>
<td>4-5</td>
</tr>
<tr>
<td>Brake pad holder bolts</td>
<td>4-5</td>
</tr>
</tbody>
</table>

Bolt preparation
This section explains how to prepare or maintain the threaded fasteners of the Speed Stop 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.