

Thank you for purchasing the Problem Solvers Cable Doubler. This product allows two brake levers mounted in different locations to independently operate one brake. Potential applications include recumbents, tandems, touring bikes, time-trial bicycles and special setups for the physically challenged. Please determine which version of the installation you will be performing and verify that you have purchased the correct version of the Cable Doubler. Note: In addition to the Cable Doubler you will need to purchase brake cables and housing that are appropriate to your installation. **Note:** Adjusting barrels are very convenient for properly installing the Cable Doubler. If you don't have any, consider adding in-line adjusters at any convenient place in the lower cable housings.

**WARNING:** Read these instructions completely before beginning installation of this product. If you lack the knowledge or tools to perform installation, please have your local professional bicycle mechanic perform the installation. Improper installation can result in loss of control or damage to the bicycle and/or serious injury or death to the rider.

**WARNING:** The Cable Doubler is not designed for simultaneous use of two brake levers. It is important that only one brake lever is used to actuate the brake, not both levers at once. Routinely engaging both levers simultaneously can place undue stress on the lower cable, and could eventually result in spontaneous brake failure.

**WARNING:** Different length cables stretch at different rates. Frequent re-adjustment during initial stretching periods is critical to maintaining proper balance between the two levers. Failure to maintain lever synchronization can mean one brake lever works properly while the other delays before actuating the brake. Check frequently before riding and always adjust any lever free-play.

**WARNING:** Check the brake system frequently. If there is significant free-play in your brake lever, this indicates that the slider may have bottomed-out on the double housing stop, or that the upper brake cable may be slipping out of the slider. Either condition could result in loss of braking. Inspect the system and correct as necessary.

**PARTS**

- |   |  |
|---|--|
| Two (2) upper housing pieces (required) | One (1) outer tube (included)                        |
| One (1) sliding piece A (included)      | Two (2) balancing springs (included)                 |
| One (1) sliding piece B (included)      | One (1) lower housing piece (required)               |
| One (1) single housing stop (included)  | One (1) Additional road-style brake cable (required) |
| One (1) sliding piece C (included)      | In-line adjusters (optional)                         |
| One (1) double housing stop (included)  |  |
| Two (2) slider set screws (included)    |  |

**REQUIRED TOOLS FOR INSTALLATION**

- One (1) cable & housing cutter
- One (1) 2mm hex key
- Zip ties (optional parts)
- Light grease or lubricant (optional)
- In-line adjusters (optional)

**INSTALLATION**

This setup allows each brake lever to operate the same brake without fighting any feedback or the return springs in the other lever. Balancing springs inside the CableDoubler assembly allow one lever to stay in place while the other is squeezed and vice-versa.

**ASSUMPTIONS:**

- You have cable-operated brakes: calipers, cantilevers, V-brakes, drums or disks.
- Brake levers do not need to be identical, but should pull the amount of brake cable required to operate properly.
- Cables are standard road- or mountain-type 1.5 or 1.6mm diameter cables.

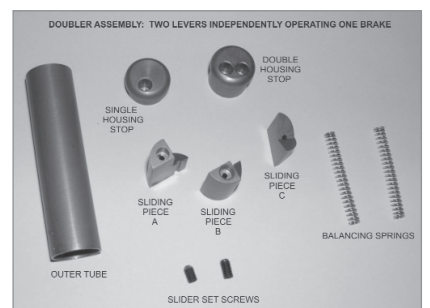


Figure 2 - components for two levers, one brake operation

**INSTALLATION, continued**

1. Begin by determining what type of brake cables your levers require, road or mountain-style. You will need one of each of those cables for each lever and one additional road-style brake cable for this installation, as well as bulk lined brake cable housing of the appropriate length. You will also need cable & housing cutters, a 2mm hex key, cable crimps, zip ties (optional), in-line adjusters (optional) and other tools as specific to the application.
2. Determine a suitable location for the Cable Doubler. Any place that provides rattle-free operation for the Cable Doubler and a smooth, kink-free path of entry and exit for housings is acceptable. Note: Two cables go from the brake levers into the top of the Cable Doubler, and one cable will be exiting out of the bottom of the Cable Doubler to the brake. Note: The Cable Doubler can be immobilized by mounting it to a frame tube. This is not necessary but may prove to be helpful for your setup.
3. Cut the upper housing pieces to the appropriate length and deburr the ends.
4. Install one brake cable in each of the brake levers (the "upper cables"), slide the upper housing pieces and in-line adjusting barrels over the cables, and then slide the double housing stop over the cables. Now install the balancing springs by sliding each of them all the way onto the upper cables and seat them into the counter bores in the backside of the double housing stop.
5. Install sliding pieces A and B by sliding them over the upper cables until the balancing springs fit snugly in their counterbores. Note: Make sure the upper cables and housings are seated firmly in their locations and that any adjusting barrels are set where you want them.
6. Use one hand to hold the cables and your thumb to pre-load the assembly as shown in fig. 2. Note: A few millimeters of preload on the balancing springs is all that is necessary.
7. When the sliding pieces A and B are lined up and symmetrical to each other, firmly tighten both slider set screws with a 2mm hex key. Squeeze each brake lever a few times to verify that the balancing springs are working properly, the levers return nicely, there is no friction in the system, and the sliding pieces do not hit the double housing stop when the levers are pulled all the way. If everything is working properly, cut off the extra cable protruding from the bottom of the sliding pieces. Do not leave more than 3mm protruding and do not use a cable crimp.
8. Install one road-style brake cable (the lower cable) into sliding piece C. Be sure the cable end fits all the way down into the counterbore. A snug fit is desirable, but don't force it: Note: Sometimes there is flashing on the cable ends that needs to be filed off for this to be completed.
9. Fit sliding piece C onto sliding pieces A and B as shown in fig. 3.
10. (Optional) Apply a small amount of a very lightweight grease or lubricant inside the outer tube.
11. Slide the outer tube over the lower cable and the sliding assembly until it is seated onto the double housing stop. Rotate the outer tube so that the arrows on the tube and the housing stop align with each other.
12. Slide the single housing stop over the lower cable and seat onto the outer tube. Be sure that the cable comes straight from the sliding assembly, through the tube, and out of the housing stop without tangling or twisting. If done properly, the alignment arrows on the single housing stop should easily align with those on the outer tube. The completed Cable Doubler assembly should look like fig. 4.
13. Cut to length, deburr and install the lower cable housing onto the lower cable. Attach lower cables to brake, trim cables, install crimps, and adjust per the brake manufacturer's instructions. If you planned to affix the Cable Doubler to a frame tube, do so now.
14. After installation, squeeze the lever several times to check for problems and to stretch and seat the cables and housings. Synchronize the two brakes by letting more cable in or out of the individual brakes manually or with adjusting barrels. Do so until the desired lever travel is reached and the brakes hit the rims at the same time. Failure to do this accurately can result in unbalanced braking and loss of handling. If you do not have an adjusting barrel, disassemble the Cable Doubler unit and re-adjust sliding pieces A and B so that they are again symmetrical as described in Step 2.6.

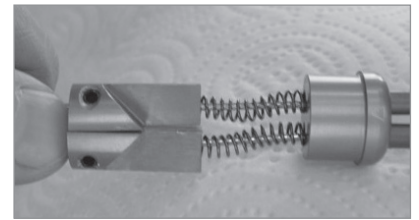


Figure 2

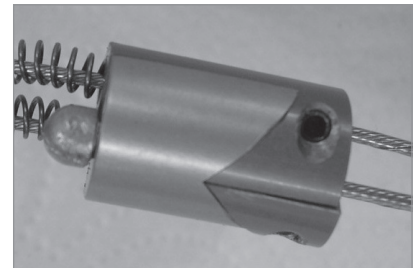


Figure 3



Figure 4

**LIMITED 2-YEAR WARRANTY**

This Problem Solvers product is warranted against defects in materials and workmanship for two (2) years, from the original date of retail purchase by the consumer, subject to the limitations detailed below. This limited warranty is expressly limited to the repair or replacement of the original product, at the option of Problem Solvers, and is the sole remedy of the warranty. This limited warranty applies only to the original purchaser of the Problem Solvers product and is not transferable. In no event shall Problem Solvers be liable for any loss, inconvenience or damage, whether direct, incidental or consequential or otherwise resulting from breach of any express or implied warranty or condition, of merchantability, fitness for a particular purpose, or otherwise with respect to this product except as set forth herein.

This warranty does not cover the following:

- Damage due to improper assembly or follow-up maintenance or lack of skill, competence or experience of the user.
- Products that have been modified, neglected, used in competition or for commercial purposes, misused or abused, involved in accidents or anything other than normal use
- Damage or deterioration to the surface finish, aesthetics or appearance of the product

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