



# Ozone Rush 4 brake line replacement

Replace a brake line on an Ozone Rush 4 ML. This guide should be suitable for brake line replacements on many other paragliding wings too.

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## INTRODUCTION

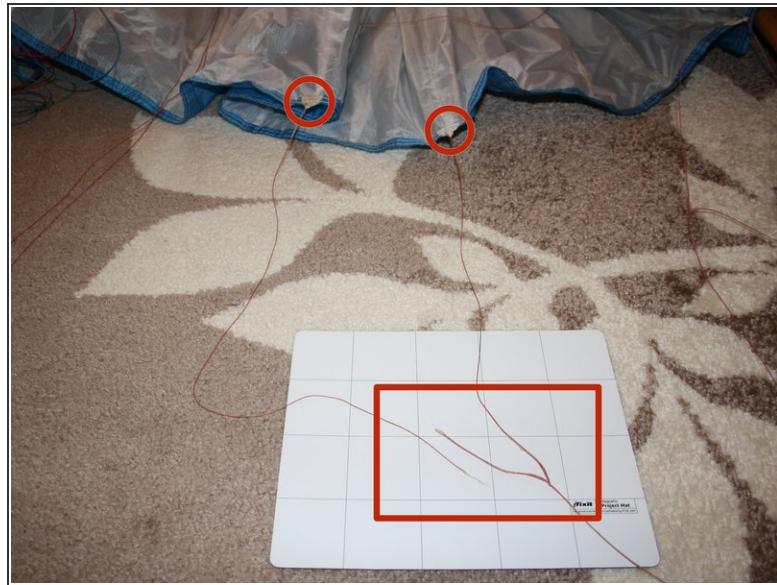
This guide shows how to detach the brake handle, unrigging the brake lines until getting to the broken line, unrigging the broken line, rigging a new replacement line and re-rigging the brake again, finally attaching the brake handle again.



## PARTS:

- Replacement Brake Line (1)

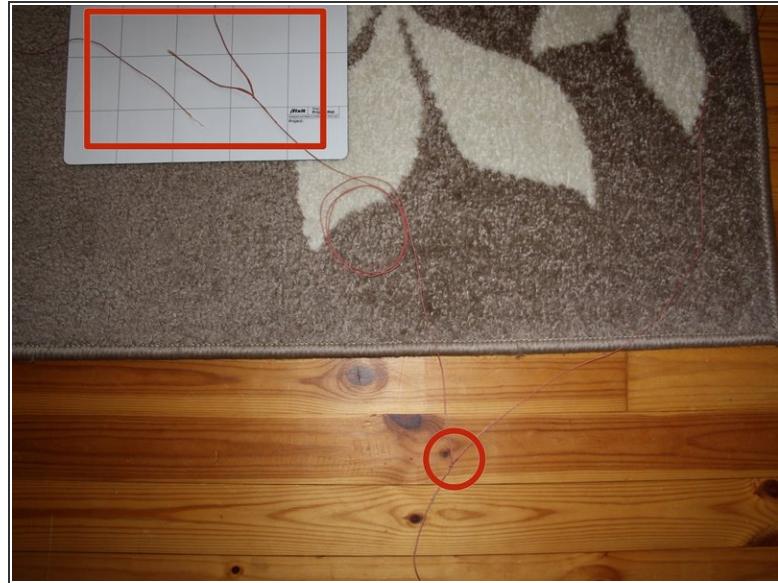
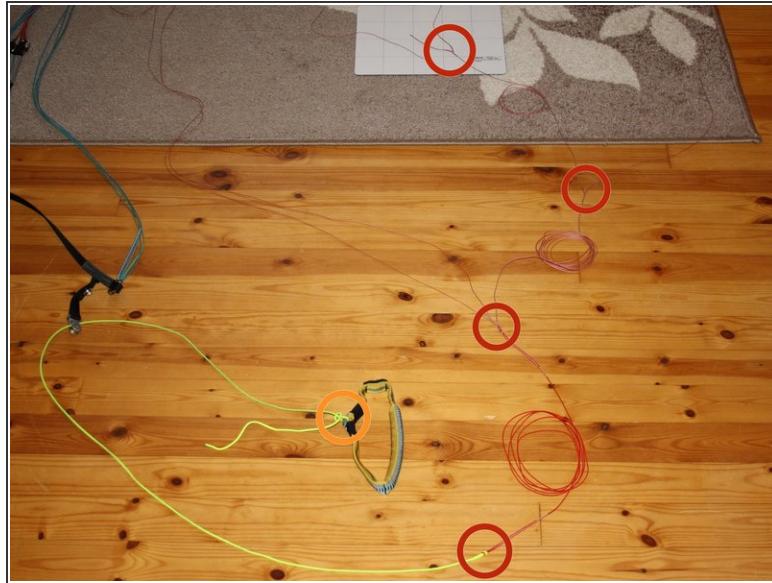
## Step 1 — Glider, lines and riser preparation



**⚠ WARNING: Be sure to carefully follow every step of this guide. Failure to do so may result in serious injury or death.**

- It is most important not to tangle lines when replacing any line on your glider. If you do not have much space it is even more important to first identify the broken line and then isolate the the broken line and all cascades from the glider to the risers.
- In this case a brake line of the upper cascade is broken.
- Start by isolating the affected suspension loops on the glider and untangle all lines - down to the brake handle

## Step 2 — Untangle and isolate all cascades



- Isolate and arrange all cascades as clean as possible. It is easier to work with the lines if you know and see where they are going.
- Note that in this case we need to open 4 cascades and the brake handle knot to replace the upper cascade brake line.
- brake handle knot
- line cascades (looped trough)

## Step 3 — Opening the brake handle knot



- Now that everything is in order we can start by opening the brake handle knot.
- ⓘ Take note how your brake handle knot is done. It may be a different knot than in my case which seems to be the way how Ozone and many other manufacturers do the knot.
- ⚠ Open the knot carefully. Try to not bend the line material too much!

## Step 4 — Remove the brake line from brake handle



- ⓘ Before removing the brake line check if there is a mark on your line which marks the position of the brake handle on the line. If there is no mark on the line above the knot or somewhere else please use a feltpen to mark the position of your brake handle.
  - In this case i added a small mark exactly on that position on the line that was hidden in the brake handle.
  - Slowly pull the brake line to the side that goes up to the wing to free the brake handle.
- ⚠ Please be carefull not to pull the line too fast, as it could get hot and damage the line coating or the brake handle.
- The brake handle is now free

## Step 5 — Remove brake line from pulley



- The brake line on the Rush 4 - as on most other gliders - goes through a pulley.
- Remove the free brake line from the pulley by pulling on the end that goes up to the glider

**⚠** When reassembling the brake line, make sure you put the line through the pulley again. It is also important to insert the line in the right direction.

**📌** Always keep the lines untangled! It is much easier for later reassembly if the lines are not tangled!

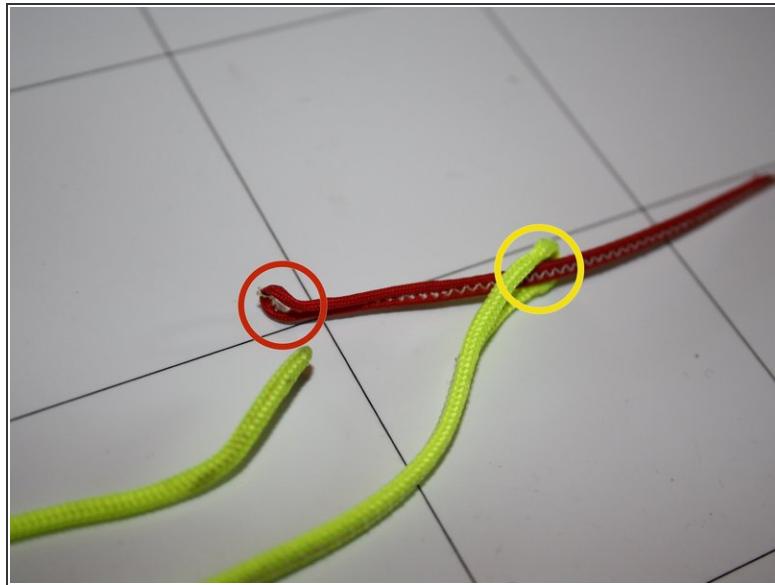
## Step 6 — Opening a looped through line connection - Part 1



- Following the brake line up to the damaged part, we reach the first line connection which is a looped through line connection
- To open the line connection, loosen the connection carefully by pushing the lines against each other carefully.

**⚠** Again! Be carefull not to bend the line material too much.

## Step 7 — Opening a looped through line connection - Part 2



- To open the looped through connection of the lines first pull the open end of the yellow line all the way through the loop of the red line
- ▣ The yellow line is the one that was connected to the brake handle. It now has one end open.
- After the line has been pulled through the loop of the red line, pull the red line through the loop of the yellow line from the side that goes further up to the glider to remove it from the yellow line
- ⚠ Again! Do not pull too fast as the line coating could get damaged.
- The yellow line is now free.

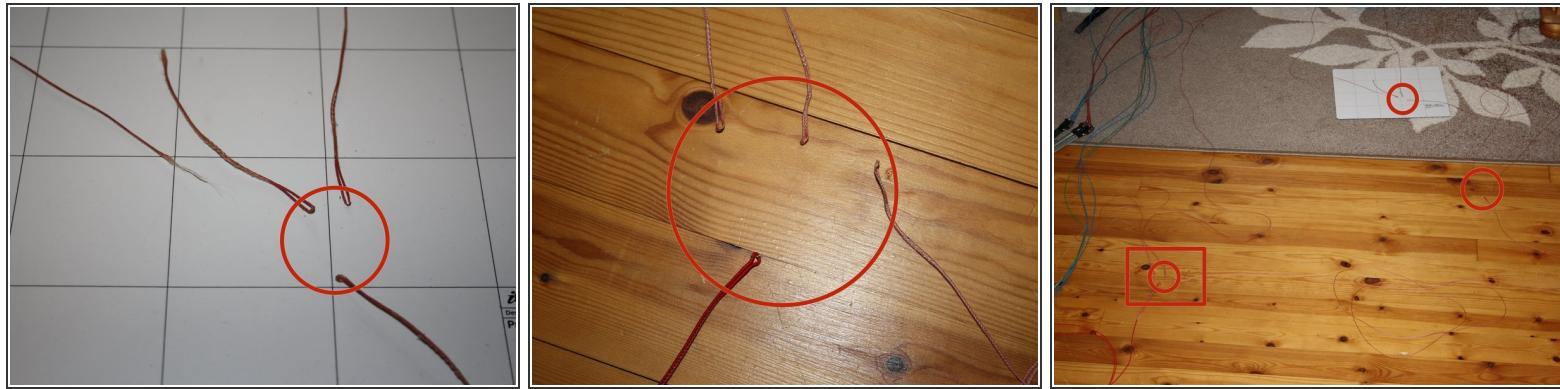
## Step 8 — Opening a looped through cascade line connection



- Following the - now red - brake line further up to the glider we will soon reach the first of the three cascades which need to be opened to replace a brake line of the upper cascade.
- The procedure to open that connection is basically the same as for the previous uncascaded loop through connection.
  - Carefully pull the open end (red line) all the way through the loops of the cascading lines.
  - Pull the cascading lines through the loop of the line that is to be removed

 Pay Attention to the uncoated lines in the upper cascades! Be even more carefull when pulling the lines through as the line material is now uncoated and you do not want to burn the inside of the line loop.

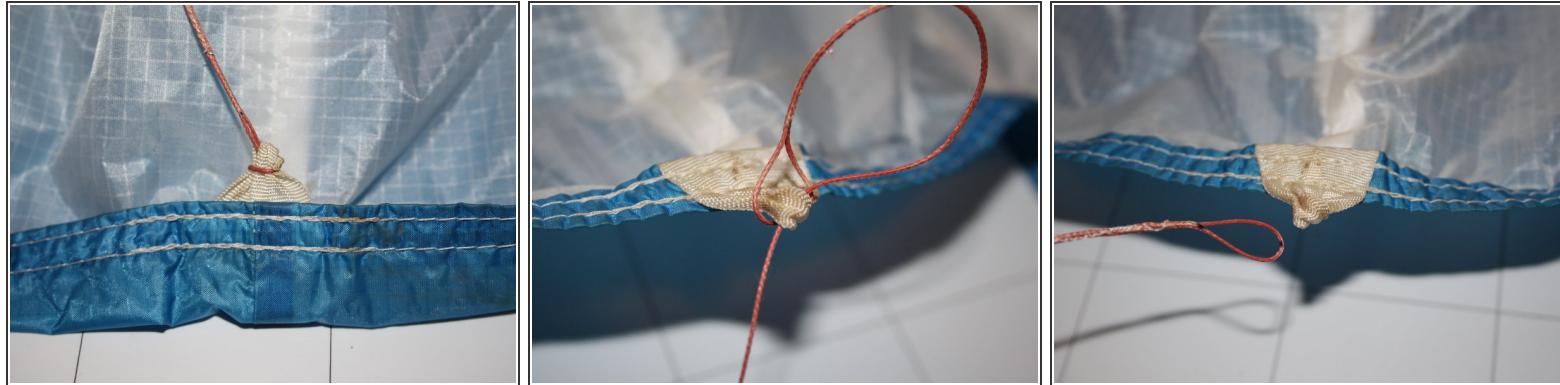
## Step 9 — Getting to the line that needs replacement



- Open all the cascades until you get to the line that needs to be replaced.
- Take note of the other cascades as shown in the picture as an example. It is best if you group the ends of the lines that need to be reconnected later.

**i** If you are not doing this often or if you feel unsure - you can tape the ends of the lines that belong together - be carefull not to tangle them!

## Step 10 — Disconnect the line from the suspension loop on the glider



- The line is looped through the suspension point on the glider in the same way as the lines are connected on the cascades or simple line to line looped through connections
- Carefully push the line against the suspension point to loosen the connection
- Pull the open end of the line through the suspension loop
- remove the lines loop from the suspension point
- The - in this case damaged - line is free

## Step 11 — Connecting the line back to the glider



- Put one loop of the replacement line around the line suspension point
- Arrange it until it is at the very top of the suspension point.
- Pull the other end of the line through the suspension point

**⚠** Arrange the line very carefully! The connection should look as clean as possible - if in doubt check the other connections for reference - and as always - pull slowly!

- Voila! Connected!

## Step 12 — Connecting break line cascade - loop through



- Put the - in this case - two cascading lines coming from the glider through one of the loops of the line going down.
- Pull the other end of the line going down all the way through the loops of the lines coming from the glider.
- Carefully arrange everything and pull tight

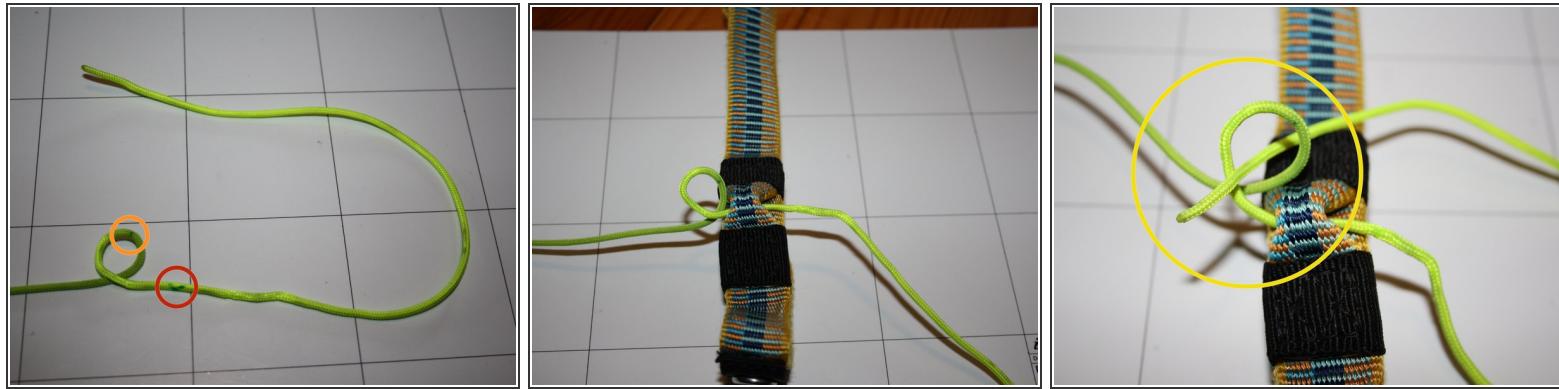
*(i)* You do not need to pull this real tight. It will fasten itself in the next few flights. Remember, you may want to change a brake line again.

## Step 13 — Insert brake line into pulley



- Insert the brake line back into the pulley.
- Take note that you insert the brake line from above so that the pulley is not tangled later.

## Step 14 — Reconnecting the brake handle - Part 1

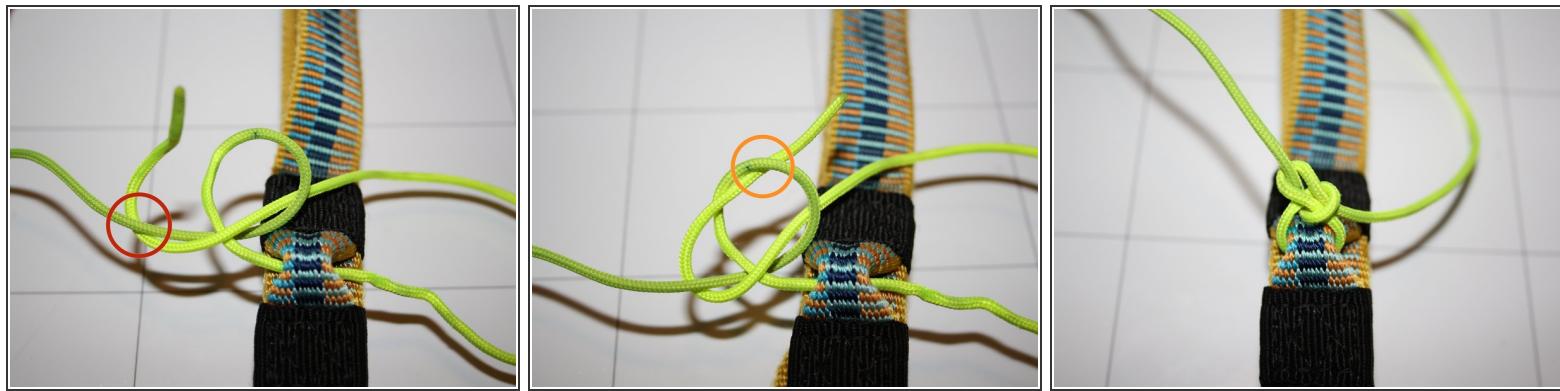


- For reconnecting the brake handle to the glider make a loop just above the mark where the brake handle has to be

 This is the mark we made in step 4

- This image also shows the mark of the manufacturer which later sits exactly above the brake handle knot
- Finally, put the end of the line back through the loop we did above the mark and continue with the next step.

## Step 15 — Reconnecting the brake handle - Part 2



- With the open end of the line that has just been put through the loop, go around the line that goes up to the glider and come back
- Continue with the end of the line and go back through the loop we are coming from
- Arrange carefully as shown in the last picture and pull tight
- Voila! Brake line knot :)

*(i)* When arranging the knot, take note of the position of the marker and arrange the marker to the position intended during the process of pulling everything tight.

## Step 16 — Beautify the rest of the line - Final Warnings!



**(i)** My glider came with a little thingie on the end of the brake line (shown in the last picture). If you want it to look 'original', this is how it is done.

- Bend the line like in the first picture
- Bend again and go back around the lines approx. 5 or 6 times.
- Put the end of the line through the loop at the end and pull tight carefully

**⚠** If you are finished with this guide! Please do a symmetry check on your glider BEFORE you go flying the next time! You can check brake line symmetry with the other - yet untouched - side of the glider and compare the length - especially the position of the brake handle.

**⚠** Also make sure that no line is tangled BEFORE flying the glider. You can do that by kiting (ground handling) the glider in moderate winds!

If you feel that something is missing please let me know!