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## The Steinberger GS-7T

*How to set up the TransTrem for proper transposing*

# 1. About setting up the TransTrem on a Steinberger GS

This document is intended to help you setting up your TransTrem (TT) on a Steinberger GS. Please note: these are not the standard “How to set up a TransTrem on a headless Steinberger” instructions, this is knowledge you should already have (instructions are available on the web). It would also help if you already had finished a few TT setups on headless Steinberger guitars, just to be sure to understand the basic steps and the underlying principles.

## 1.1 Existing information and resources, or the lack thereof



For headless Steinberger guitars there are detailed original instructions available, and these state one very basic prerequisite: you need calibrated double ball end strings to perform a successful TT setup. The term “calibrated” primarily refers to a defined length of each string, which must be provided within very narrow tolerances. Currently LaBella, D’Addario and (sometimes) Steinberger (Epiphone) provide such strings.

Calibrated strings serve exactly one purpose: to have the ball end of the string placed in a defined position relative to the pivot axis (blue line in the picture on the left) of the tremolo, **after** tuning the string to pitch. Only in this specific position the stretching and shortening of strings during tremolo usage causes exactly the correct relative pitch changes which are the most famous and important feature of the TT.

Having said that, there are exactly **zero** instructions on how to set up a Steinberger GS, which does not use calibrated strings, but regular single ball end strings instead.

## 1.2 Main differences of a TransTrem on a GS vs. a TransTrem on a headless guitar



The main differences of a GS TransTrem compared to a TransTrem on a headless guitar are:

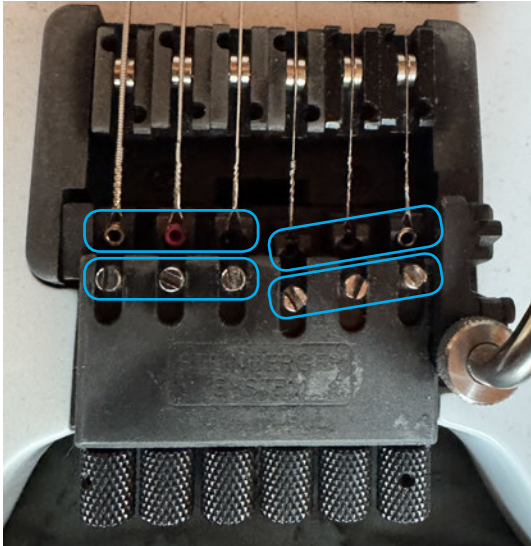
- The lack of tuning knobs on the tremolo. The jaws are held by regular M3 flat-head socket cap screws instead. Tuning is done on the headstock (with Steinberger gearless tuners). Only during setup you will have to adjust the jaw positions using the screws in the TT tuner housing until the correct positions are found.
- The master tuning knob has an extension rod, so that it can be used on the larger body.
- On many (but not all) GS TTs the jaws of the low E, A, D strings are identical to the jaw of the high E string. The higher position of the ball end in these jaws provides a little bit of additional headroom for adjustments, which may be necessary on a GS.

### 1.3 Working with calibrated strings, and how to get along without them

Without calibrated strings you'll have to find the "magic spot" of each jaw by yourself. But I will help you with doing that later, so you won't have to start from scratch. But let's first have a look at the definition of that "magic spot" on a headless guitar, to better understand the requirements for setting up the TT on a GS.

#### Basic characteristics of a TT on a headless guitar

If you look at TTs (with a correct setup) on headless Steinberger guitars, you will notice a special pattern of the jaw positions (identical to the pattern of the jaw adjustment screws, as shown in the image). This pattern appears (with some tolerances) on all correctly adjusted TTs, so you can easily spot if the guitar is using calibrated strings. With non-calibrated strings the positional pattern would look completely different. These are the positions the ball ends of the strings must have relative to the pivot axis of the TT, in order to allow correct transposing.



Why is that so? Because in these positions the stretching and shortening of the vibrating string happens exactly at the amounts required for the in-tune pitch changes. Moving the ball ends out of these positions (closer to or farther away from the pivot axis) would cause either longer or shorter distances of travel for the ball end, and thus more or less resulting pitch change than required.

Please note that you only see the horizontal position (forth-back) of the ball ends/jaws in this picture. For compensating string tolerances there's also a vertical adjustment of the jaws (up-down), done with the silver adjustment screws. This allows to adjust a TT correctly, even if string lengths are not perfectly matching the specifications (within limits of  $\pm 1$  mm) or if the tremolo is not exactly mounted in the specified position relative to the 24th fret of the neck.

Now why am I talking about headless guitars with calibrated strings, although this whole document is about the GS with headstock? Because these positions as shown in the picture (both horizontally and vertically) have always been described as a "reference" for starting a TT setup on a GS. Means: turn the tuning screws of the jaws until the jaws (and jaw adjustment screws) show a pattern as seen on the left. Although there is some truth to this information, a key detail is incorrect.

## Starting a GS TT setup with the headless TT jaw positions (or: how NOT to do it)

The usual (headless) transposing setup procedure would be as follows:

1. Tune all strings to pitch, finish the action/intonation setup and adjust the spring tension.
2. Lock the TT in the 1-up position and use the tuning knob on the back to tune to the correct 1-up pitch for the respective string (e.g., F# on the E string).
3. Lock the TT in the 2-down position and use the silver jaw adjustment screw to adjust the correct 2-down pitch for the respective string (e.g., C on the E string).
4. Repeat steps 2 and 3 until both 1-up and 2-down positions show the correct corresponding pitch.
5. Lock the TT in center position and check the standard pitch...

On a headless guitar with correctly calibrated strings the pitch in center position should still be exactly the nominal pitch for this string: E in center position, F# in 1-up and C in 2-down position.

However, on a GS (when starting with the headless jaw positions), you may get F# in 1-up and C in 2-down position, but something like E, sharp by +20 cents (or even a flat F) in the center position. Similar for all other strings. Not a usable result. Why does that happen?

This happens for one single reason: the strings on a GS are **much longer** than the calibrated double ball end strings on a headless guitar. Not the vibrating string portions between K-Nut and TT, but the whole length between headstock tuner and TT. When using the tremolo, the whole length of the string is affected, not only the vibrating part. This results in a different relative pitch change compared to a headless guitar, when using the same jaw positions. To solve that problem, the jaw positions must be set differently to cause a correctly adjusted stretching/shortening of each (longer) string.

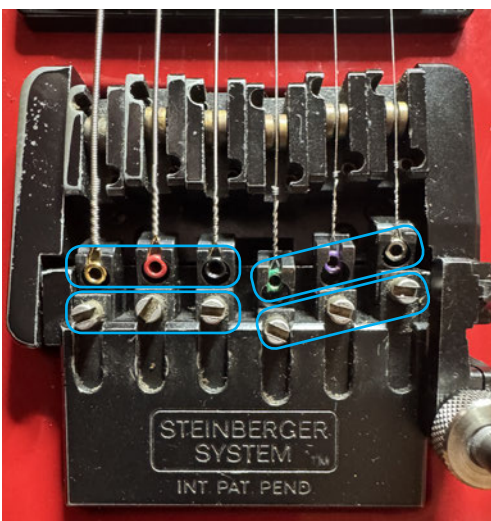
### Spoiler: This is how the working setup will look like on a GS

To better explain how things should be done on a GS (and why), I'm starting with the end result, working my way back from there.

You can see that the positional pattern of the jaws on a correctly set up GS is very similar to that on a headless guitar, however, there's a significant offset from the back. The jaws are extended much farther out of the tuner housing.

To get there (physically and mentally), you need to understand the symptom and the root cause of the failure described above.

- The symptom: the tuning is sharp in center position, after having the 1-up and 2-down positions set up correctly.
- The root cause: the string is too long and thus the ball end positioned too far back in direction of the tuner housing.



This may also happen sometimes with calibrated strings on a headless guitar, if the strings are manufactured outside of the allowed tolerance range.

- Tuning is **sharp** in center position after setting 1-up and 2-down correctly: the string is **too long**.
- Tuning is **flat** in center position after setting 1-up and 2-down correctly: the string is **too short**.

You cannot fix that issue on a headless guitar, because a double ball end string is as long as it is. If it doesn't work, you either live with it or you replace it. On a GS, though, you can adjust the active string length with the headstock tuners. Tuning up pulls the ball end away from the bridge, tuning down lets it move closer to the bridge. So the "secret formula" for getting a correct result on a GS is:

- Tuning is **sharp** in center position after setting 1-up and 2-down correctly: the ball end (jaw) needs to go farther **towards the neck** (making the string shorter).
- Tuning is **flat** in center position after setting 1-up and 2-down correctly: the ball end (jaw) needs to go farther **towards the bridge** (making the string longer).

Having finally achieved that "wisdom" during my setup sessions on a GS, I happily started turning the jaws farther out, and out, and out, until... zapp... the jaw jumped off the tuning screw, because the screw was too short. Bummer. Happened to me first on a B string, because at one point I couldn't believe I'd have to move the E string jaw out that far...

I don't know how GS TTs were originally set up in the factory, using the hardware I found in my GS TTs. Maybe they initially used different screws? I don't know. I just know it doesn't work with the standard screw lengths my TTs have, which are pretty much the same as the screw lengths of the standard (headless) tuners.

I also don't know why some of my GS TTs have high E string jaws in the low E, A, D positions, and some do not. This just suggests that these TTs were assembled by different people with different knowledge or instructions. It's important to consider that there were only **less than 200 GS guitars built with a TT**, so maybe the corresponding knowledge was not widely known.

I finally replaced all tuning screws but the G string screw by longer screws, because otherwise the jaws would either fall out during setup or would only be held by a very short part of the thread and come off later, damaging the threads.

OK, now you've got all the background history to the instructions you've been waiting for all the time, starting on the next page. Thanks for taking the time to read all that text, it will probably help you later developing an "intuitive" approach to the GS TT setup. Good luck :-)

## 2. TL;DR... how to set up the TransTrem on a Steinberger GS

Disclaimer: I've written the following instructions based on my own experience with headless TT setups (many, many) and GS TT setups (only two until now). There may be better ways to do it, but I haven't found them yet. So feel free to develop even better strategies and procedures, and maybe...share them with us :-)

### 2.1 Preparing the strings

I have used D'Addario EXL125 (9-46) on my guitars, so please be aware that using different strings may lead to different results.

**NOTICE:** Avoid unnecessary string breakage!

Before installing any plain string on your GS, **solder the wrapped area close to the ball end.**

Plain strings (G, B, E) tend to unwrap and break under the repeatedly changing tension of a tremolo setup or usage. They do it either quickly and break while adjusting the 1-up position, or slowly by going out of tune again and again after just having finished the setup, until they break when retuning.

### 2.2 Replacing the TransTrem tuning screws

#### Required screws

The original flat-head socket cap screws I found in my TTs or in separately sold "GS conversion kits" are:

- Flat-head socket cap screws  
M3 thread (metric, 3 mm, pitch 0.5 mm)  
Length 16-18 mm

I have replaced the screws for all jaws except the G string jaw by:

- Flat-head socket cap screws  
M3 thread (metric, 3 mm, pitch 0.5 mm)  
**Length 25 mm**

#### Required tools

- A **2 mm hex key** for turning the tuning screws.
- **Tweezers** for removing and inserting the small springs on the screws.

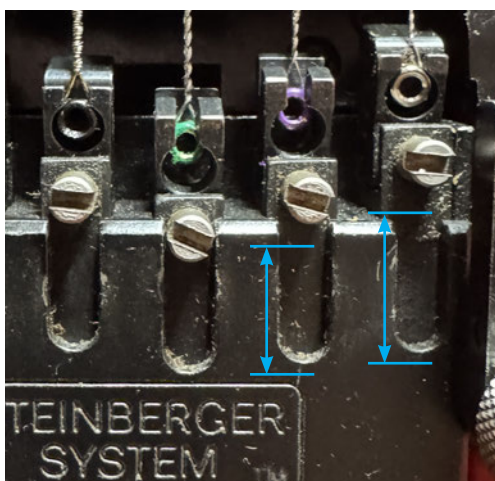
You do **not** need to disassemble your TT for replacing the screws (but of course you may, for learning reasons). The picture on the left just shows how the parts look like internally.



### To replace the tuning screws

1. Remove all strings from the guitar (if you haven't done that yet).
2. Turn the tuning screws counter-clockwise using the 2 mm hex key until the jaw comes loose.
3. If necessary, remove the saddles in front of the jaws, to allow pulling the jaws fully out.
4. Use the tweezers to pull the springs from the tuning screws, so they won't disappear somewhere in the tuner housing.
5. Push out the short tuning screws and insert the longer tuning screws instead.
6. Use the tweezers again to put the springs onto the tuning screws.
7. Insert the jaws again and turn the tuning screws until they are held safely in place.
8. Put the saddles back in place, but do not yet lock them. You'll still need to adjust action and intonation before starting the TT setup.

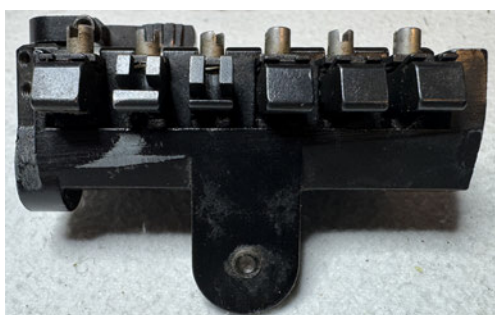
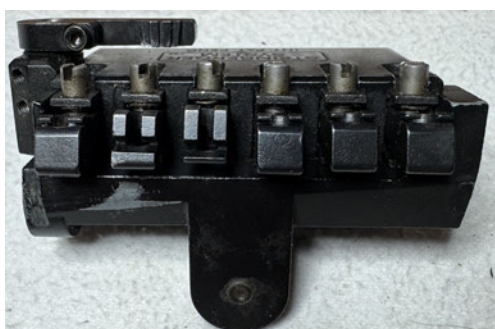
### 2.3 Adjusting the initial jaw positions for an easy TT setup



If you put the jaws into the “probably correct” positions right from the beginning, even before inserting the strings or starting the TT setup, you should be able to finish a complete setup in (relatively) short time. My first setup (including full TT service, replacing broken TT parts and finding out everything else) took two full days. You should be able to do that in an hour or so :-)

I've used calipers to measure the distance between the lowest part of the cutouts on the tuner housing and the jaw adjustment screws, as shown on the left. For the strings I've used (D'Addario EXL125) these are the horizontal positions after finishing the setup. You could use those as starting values for your setup:

String	Distance (mm)	Distance (in)
E	10.7	0.421
A	11.8	0.465
D	11.6	0.457
G	10.3	0.406
B	12.4	0.488
E	14.9	0.587



1. Lock the TT in one of the down positions to get easier access to the hex sockets of the jaw tuning screws.
2. Adjust the **horizontal** positions of all jaws according to the table above.
3. Lock the TT in center position.
4. Adjust the **vertical** positions of all jaws to be around the middle of the possible up/down range. You'll need to be able to move them up or down later. See the pictures on the left for reference.
5. Leave the TT locked in center position.

## 2.4 Setting the transposing ranges

After having set the jaws to their initial positions, you can start inserting strings and doing the setup.

### To insert strings and finish the action/intonation setup

1. Lock the TT in center position (if not done already).
2. Put each ball end into its corresponding jaw (as far down as each jaw allows) and guide the other end of each string through the opening in the gearless tuner on the headstock.
3. Pull on the string until it's straight, running over saddle and K-Nut without slack, and lock the string with the clamping knob on the gearless tuner (only as tight as doable by hand, no tools).
4. After having inserted all strings, tune the guitar to pitch.
5. Adjust the saddles for desired action and correct intonation, and lock them in place afterwards.

**NOTICE:** Setting the action too low may interfere with the tremolo usage and the transposing feature!

Because the jaws are turned out of the tuner housing much farther than on a headless guitar, they also reach a higher position vertically in relation to the saddle. This might lead to a ball end which is at the same height or even above the roller of the saddle, especially on the high E string. Watch the ball end position during setup to avoid such problems. Each string should have at least a minimal break angle when running over the saddle.

6. Unlock the trem, and adjust the master tuning knob for correct spring tension, so you can easily lock the trem in up and down positions afterwards.

### To set up the transposing range and the correct string length

The whole procedure for setting the transposing ranges on a GS will be different to the regular headless TT setup for the following main reasons:

- You first need to adjust the correct string length using headstock tuners and jaws, which is an iterative sequence of interdependent settings. Starting at plausible initial jaw positions will significantly reduce the time for that part of the setup, though.
- You cannot use the normal procedure of setting the 1-up position with the (jaw) tuners, and then setting the 2-down position with the jaw adjustment screw, simply because the GS tuning screws are not accessible in the 1-up position. You can only adjust them when the TT is locked in a down position.

For understanding the following steps for adjusting the string length, remember the “string length logic” explained earlier in this document. We will now reverse this logic and apply it to the setup process:

### Logic on a headless TT:

If tuning is **sharp** in center position after setting 1-up and 2-down correctly, the string is too long. The ball end (jaw) needs to go farther **towards the neck** (making the string shorter).

(And vice versa)

### Reversed logic for the GS TT:

If tuning is **flat** in 1-up position after tuning the **center** position to correct pitch, the string is too long. The ball end (jaw) needs to go farther **towards the neck** (making the string shorter).

(And vice versa)

### Transposing setup, step by step

1. Tune the first string to pitch in center position.
2. Lock the TT in the 1-up position and check the pitch.
  - If the pitch is flat in the 1-up position, the string is too long. The jaw must move towards the neck.
  - If the pitch is sharp in the 1-up position, the string is too short. The jaw must move towards the bridge.
3. Lock the TT in the 2-down position and turn the (horizontal) tuning screw for the jaw according to the two options above, to make the string shorter or longer as needed. Don't check the pitch yet in this position, just move the jaw according to your "gut feeling". The closer the 1-up pitch is already to the desired pitch, the smaller the required distance to move the jaw.
4. Lock the TT in the center position again and retune to pitch.
5. Lock the TT in the 1-up position and check the pitch again.
6. Repeat the steps 2-4 until the 1-up position is **pretty close** to the desired pitch (must not be perfect yet), and then start checking and adjusting also the 2-down position.
7. If the 2-down position is flat or sharp, turn the (vertical) jaw adjustment screw accordingly to adjust the pitch. Sometimes the pitch display on the tuner doesn't directly update when turning this screw, so first go back to the other positions again to check the pitch:
8. Lock the TT in the center position again and retune to pitch.
9. Lock the TT in the 1-up position again, check the pitch.
10. Then return to the 2-down position again and check the pitch. Adjust horizontal position (if 1-up is out of tune) and/or vertical position (if 2-down is out of tune) as needed.
11. Repeat until the desired level of perfection is reached, and then proceed with the remaining strings.
12. When done, re-adjust the master tuning knob again.

That's it. I hope you were able to set up your GS TT correctly. There may be variations of the initial startup/setup values I've given here depending on the string brand and gauge you're using. I hope to collect more starting value sets for different types of strings in future, if I notice major differences.

If you find mistakes or have questions or comments, please send me an e-mail to:

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