

# *LTwist<sup>®</sup> gauge*

*by PosiTech Design<sup>®</sup>*

## **User manual**

Congratulations with choosing our "unique-and-only" LTwist<sup>®</sup> precision tool to accurately measure longitudinal neck twist on guitars, bass guitars, and other stringed instruments.

This tool will help you to check objectively if a longitudinal twist on your (bass) guitar neck exists and how to interpret the values (see Section 3 below). This check can be done instantly and on-the-spot during any stage of building, assembling, building, repairing, buying, selling, etc.

### **1. Preparation**

1. Place the instrument on a stable and flat surface.
2. Ensure that also the instrument itself (body and neck) is in a flat and stable position without "wobbling" (see Fig. 1). Placing a wedge of e.g. carton under the body may be required to optimize stabilisation.

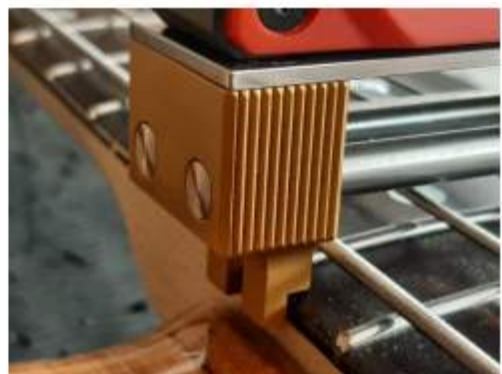


*Figure 1. Guitar in a flat position on a stable workbench surface.*

3. There is no need to place the instrument exactly level as this is taken care of by the "zero" setting function of the digital unit.
4. If a neck support is used, ensure that it is sufficiently low for a relatively flat position of the neck (preventing a large angle).
5. Take the measurements on the instrument with fully tensioned strings to ensure the most accurate results.
6. In case of a neck-only situation, the measurements can still be taken. If so, please take minor result deviations into account.

### **2. Measuring**

1. Place the (fixed) left-hand leg of the LTwist<sup>®</sup> gauge with the small rectangular recession directly on the left-hand top side of the fretboard at the body end of the neck as shown in Fig. 2.



*Figure 2. Fixed left-hand leg of the LTwist<sup>®</sup> gauge in position on the fretboard.*

2. Slide the right-hand leg of the gauge carefully but firmly against the right-hand top side of the fretboard (same as the left-hand leg) as shown in Fig. 3.



Figure 3. The sliding right-hand leg of the LTWIST® gauge in position on the fretboard.

3. The notch at the bottom of the two legs of the LTWIST® gauge is designed to bridge a center fret when placing the gauge at this side of the neck (see Fig. 4). This is especially relevant for short-scale and 2-octave necks.



Figure 4. Notch in the leg of the LTWIST® gauge bridging a fret.

4. The optimal location of the first measuring point (see point 1 of this section) is where the (bass) guitar neck joins the body. On a Fender type full-scale (bass) guitar this is typically around the 16th fret but this will vary with different neck configurations and body shapes/constructions.

5. Reset the initial absolute value (the "abs" value) to the relative "inc" value (zero/0) directly on the digital inclinometer unit or in the Sola Measures app on your android phone or i-Phone. Please see the separate Measures App user guide included in the package. This app can be downloaded with the Google Play Store or Apple Store.
6. Place the LTWIST® gauge at the headstock side of the neck same as at the body side without changing the setting of the Sola® digital unit.
7. The value on the inclinometer or the Measures app now reads the difference (delta) value in degrees. This value represents the longitudinal neck torsion in degrees (one- or two-digit readings can be selected). The arrows indicate if the torsion direction is clock-wise or anti clock-wise.
8. Although the Sola® digital unit can also read mm/m, % and inch/ft (in decimals and fractions), it is strongly advised to only use degrees (°) as primary and most accurate measure for this particular use.

### 3. How to interpret the measured values

As the LTWIST® measuring gauge is new to the market, best practices still need to settle in on how to exactly interpret the measured values and decide if/what correction actions can be considered on your instrument. Please be aware that, by nature, any (bass) guitar will have a certain amount of longitudinal twist.

Experience during prototype design and multiple user tests have so far revealed that a zero twist (i.e. a delta value of  $0.0^\circ$ ) is a true exception, whereas a sound value of  $0.2 - 1.0$  degrees is much more common. Values between  $1.0^\circ$  and  $2.0^\circ$  are less common but may still be addressed by standard tuning of saddle and bridge (especially if the torsion is in clock-wise direction, which is also indicated by the digital unit, see Fig. 5). Values above  $2,5^\circ$

may still be addressed with compensating fretwork leveling, but values  $> 3.0^\circ$  will get into the area of rework on the fretboard itself (with fret removal accordingly).



Figure 5. Example of an anti-clockwise twist of  $0.3^\circ$  as indicated by the arrows. For a level position a clock-wise turn is needed.

#### 4. The Sola Measures app and documenting the measuring results

With the free Sola Measures app, measuring can be done remotely without touching the digital unit. This supports an optimally stable measuring session. Please see the included Sola user guide how to install and use this app.

The measured values can be documented with a photo of the gauge display on the instrument, including a data log from the Measures app with a time and data stamp (see Fig. 6). This provides a real-time report of the measuring results of the individual instrument.



Figure 6. Photo with validated data log and date/time.

#### 5. Extended use of the Sola digital unit

When detached from the mechanical LTWist® unit, the digital Sola meter can be used in multiple other ways as a stand-alone inclinometer or leveling meter. Herewith a few examples:

- It can be used as a general inclinometer or level gauge for various woodwork and construction jobs.
- The angle of the neck on the guitar body can be measured to decide if shims are needed.
- During the design and construction process of a (bass) guitar the luthier can measure various angles of body and neck, e.g. the angle of the neck.

#### 6. What is included in the product package?

The product package includes the complete/integrated and ready-to-use set consisting of the following:

- the mechanical Positech Design LTWist® unit
- the Sola digital unit
- a dedicated user guide for the integrated set
- a separate user guide for the Sola digital unit and the Measures app
- one AA battery