

MANUAL FOR THE STRINGLAB 2. (concept)

The way the Stringlab 2 operates.

The Stringlab 2 can measure the stiffness of the string bed and the bending stiffness of the racquet. It can be used for all types of racquets. The test result is shown in kilogram per cm (kg/cm), which shows how much force is needed to create a deflection of 1 cm.

The measured value is the same as the DT value, which is used for string bed stiffness in tennis.

Preparing the system for use.

* Remove the foil between the contacts of one of the batteries / or place the batteries in the holder.

- Open the sliding lid at the bottom of the frame towards the centre of the frame with a pin in the holes.

- Place the Lady batteries with the flat sides against the springs.

- Close the lid.

* Badminton support ring.

- Remove the protection foil before fixing the support ring to the frame.

- Fix the support ring at the side of the display with a countersunk bolt (instead of the round headed Alan bolt).

- Fix the ring at the other side with a countersunk bolt and a nut from the inside of the frame. The nut can be inserted through a hole in the bottom of the frame with a tubespanner of 7 mm.



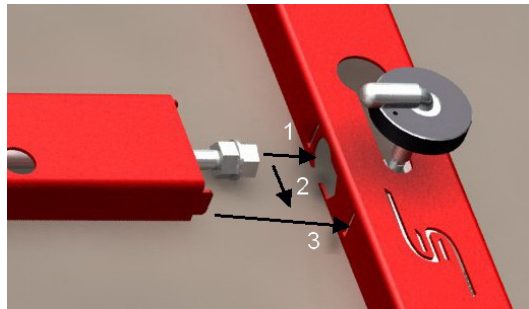
* Connecting the RA unit to the Stringlab 2 measuring system.

- Turn the knob at the end of the frame anticlockwise until the nut at the other end comes out far enough.

- Move the outer nut and the washer through the round part of the hole in the frame.(1)

- Slide the nut into the 4 sided hole with the washer on the inside of the frame (2)

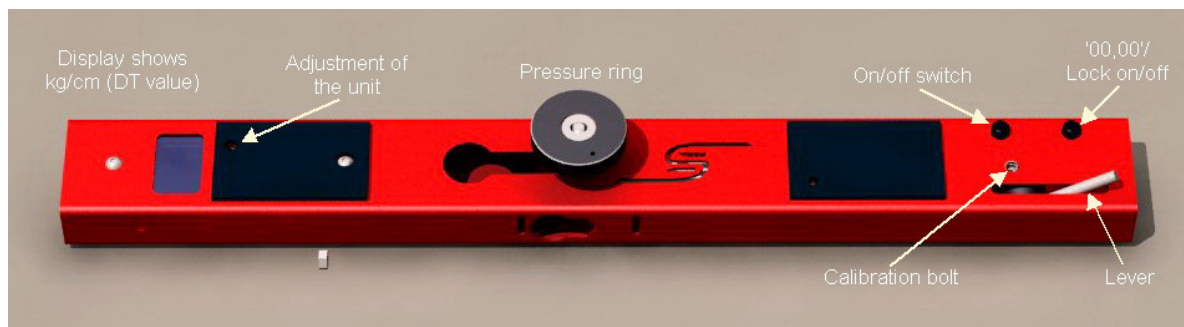
- Turn the knob clockwise while the lips are guided into the slots. (3)



* Turn the pull rod upwards.

The pullrod is hided inside the frame for transport, turn it upwards before use.

The funtions.



The picture shows the functions of the Stringlab 2 measuring system:

* The display shows the test result in kg/cm, when it is adjusted at LB (bottom left)

* The system must be adjusted at 'LB' to obtain a test result in kg/cm. By making contact with the printed circuit through the hole the test unit can be adjusted. Once it is adjusted at the right unit it stays that way until the battery is removed.

* The pressure ring must be placed on the string bed by sliding it over the pull rod, with the slot in line with the flat sides of the pull rod. The ring can be locked in that position by rotating it a quarter of a revolution.

* The "on/off switch" switches on the electronics, the display will always read '0,00' then.

* The '00,00' / 'lock on/off' switch has 2 functions:

- To "zero" the display at the beginning the measuring stroke.

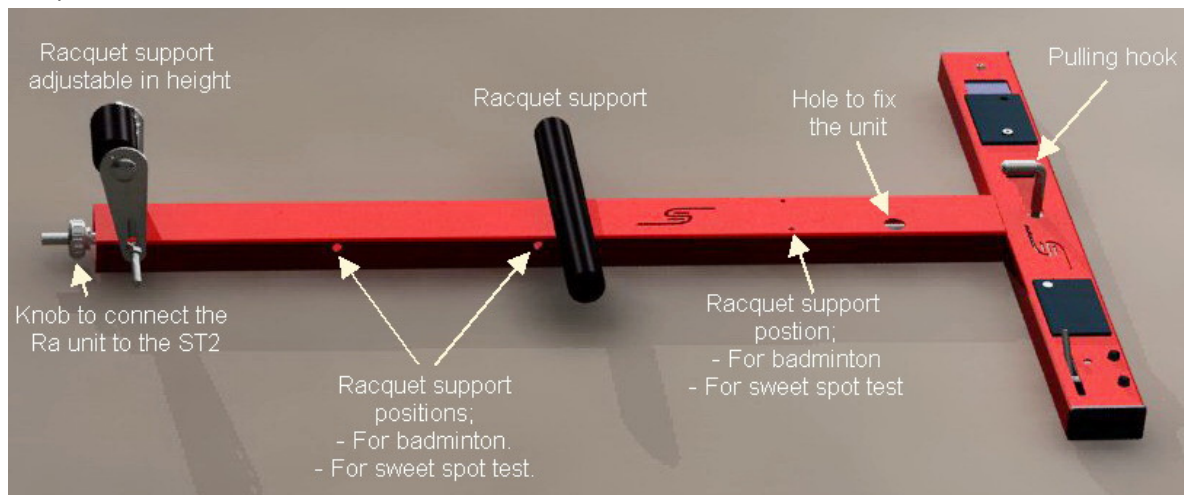
- The display can be locked after 4 seconds, when the user does not want to measure the loss of tension.

Hold the button until the display shows L-on or L-of, to switch the lock on or off.

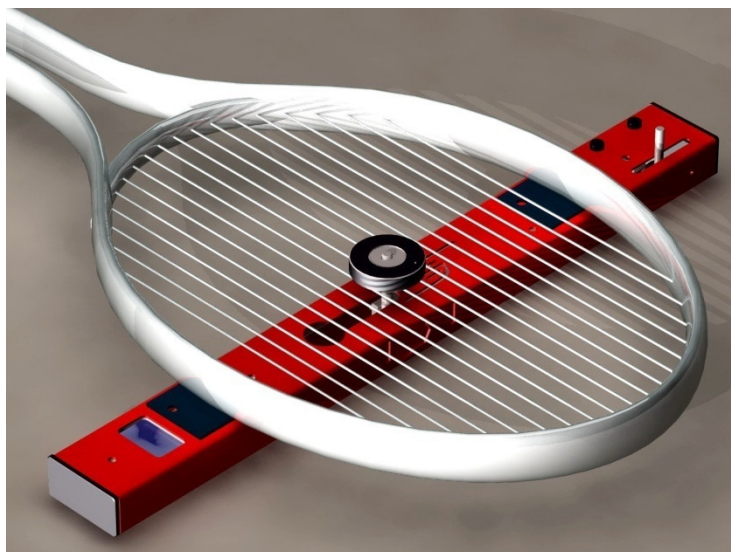
* The calibration bolt can be used to calibrate the system with an optional spring.

* The lever can be switched in 3 positions: Starting position, start of the measuring stroke and test result position.

The picture shows the functions of the RA unit.



To measure the string bed stiffness (SBS).



The SBS is measured as follows:

* Switch the handle to the starting position (towards the centre of the system).

* Put the racquet on the measuring system with the pull rod through the string bed in the position where the SBS must be measured.

* Slide the pressure ring over the pull rod with the big opening upwards. Lock the ring by rotating it a quarter revolution without deflecting the stringbed.

* Switch the lever to the middle position and push the '0,0' button to zero the display.

ATTENTION: It is important that the pressure makes good contact with the stringbed. If this is so the reading should differ at least 3 kg/cm compared to the starting position.

* Switch the lever to the end position, the display shows the string bed stiffness now.

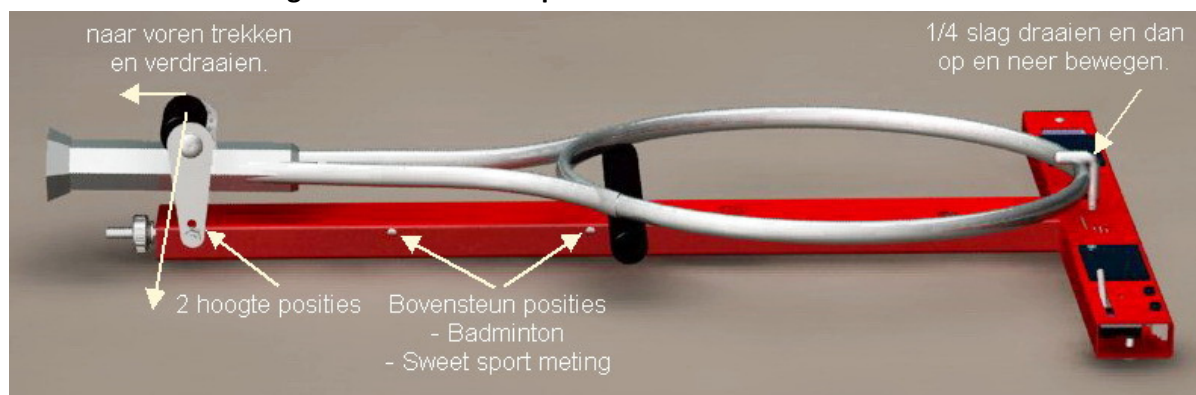
ATTENTION: Do not touch the lever while reading the test result!

* When the loss of tension should not be measured under load, we advise to switch the lock of the display on.

- Badminton racquet.

To measure the SBS of a badminton racquet it is important to use the support ring, to avoid deflection of the frame during the test.

To measure the bending stiffness of the racquet.



The height of the racquet should be adjusted so that there is a little pressure between the hook and the head of the racquet in the starting position.

- The hook can be adjusted up and down after rotating it a quarter revolution and lock it again in the right position.

- The upper support can be adjusted by moving the roller forward, out of the locking holes, and rotating it.

- The brackets have 2 mounting holes to fix it to the frame in different height.

The racquet-stiffness test in the same way as the SBS test:

Switch the lever to the middle position, zero the display and switch the lever to the end position.

The display shows the bending stiffness in kg/cm now.

For tennis racquets.

The picture shows the set up to test tennis racquets, the supports are in the same position as on the Babolat RDC machine .

We will offer a table showing the relation between the stiffness in kg/cm and Ra value.

Badminton racquets.

We do not know of used support positions to test badminton racquets on stiffness.

We advise to put the upper support in the middle position and the lower support in the position closer to the head of the racquet.

Advanced tests.

* To measure the loss of tension.

It may be useful to know the loss of tension of a new string bed with a certain string. When the SBS is measured directly after stringing the test value will go down more or less.

The more and the quicker the test value goes down the more the string loses tension. To test the loss of tension the display must be unlocked.

* Elastic SBS and bending stiffness (return stroke).

The bending- and string bed stiffness both show the elastic force generated by the strings or the racquet, so it is always the elastic force that is measured.

When a lot of remaining deflection occurs in the measuring situation, it is advised to use the “return stroke principle”:

Switch the display to 0,0 in the measuring position and DIRECTLY switch the lever back to the middle position. The read out will be much more stable than.

This principle can always be used when the user prefers this way of measuring.

- Measuring the size of the sweet spot area.

The stiffness of the string bed can be measured in every position. The smaller the difference in stiffness, the bigger the sweet spot of the racquet.

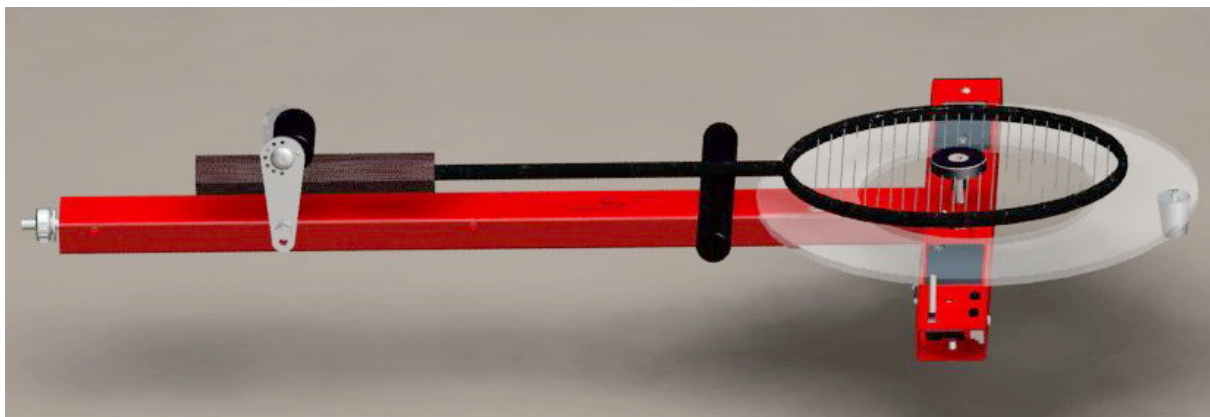
In most cases the string bed will be stiffer at the side where the stringer started with the cross strings.

- Measuring the bending stiffness in the Sweet spot.

When the player hits the ball or the shuttle in the centre of the string bed he feels the bending stiffness of the racquet in that position. Therefore it is better to measure the bending stiffness in the sweet spot of the racquet.

For badminton:

Because the SBS is much higher than the bending stiffness of the frame the bending stiffness in the sweet spot can be measured with the pressure ring on the string bed.



For tennis.

In tennis the bending stiffness of the frame lies much closer to the stiffness of the string bed.

Therefore it is better to do the bending test with the hook connected to a crossbar which lies over the frame. This can be a simple piece of wood as long as it is stiff enough.

The measuring accuracy.

The test accuracy of a measuring system is given in percentage of the maximum value. A variation of +/- 0,5 to 1 % is good for such a system. This means for the Stringlab 2 that the admissible variation for more measurements in the same position is +/- 0,25 to 0,5 kg/cm.

When the same measurement is repeated after positioning the racquet again or the next day the accuracy can be lower because the position or the circumstances can be different.

We think that the variation in the tests with the Stringlab 2 is much less than 0.5 %.
