

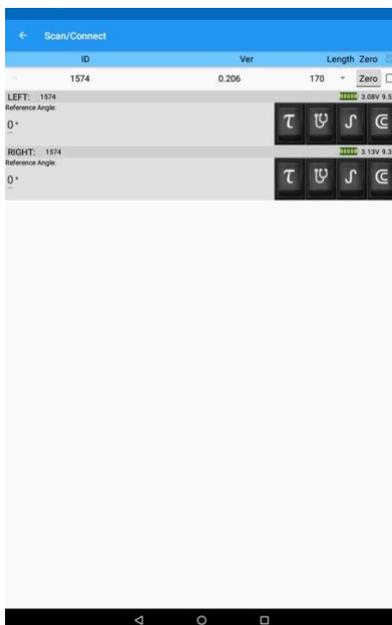
## Basic Outline of VINC – Verve InfoCrank® Nerve Centre.

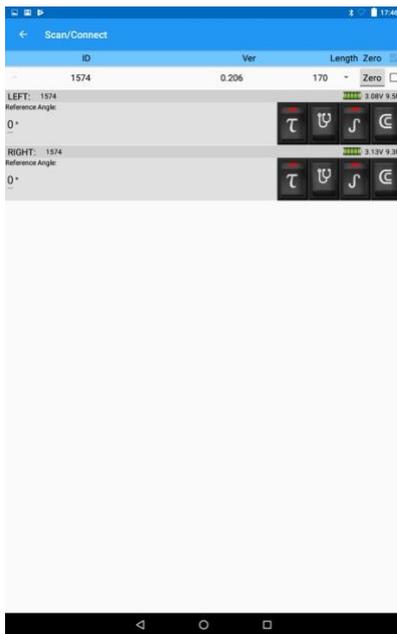
The first time you open VINC, you will need to pair your cranks to the system. This is done by hitting the “refresh” button in the right corner (next to the record button)

This brings you to this screen. Activate your cranks and after the system checks them you will see the necessary details including battery strength and firmware level.

User actions;

- Change the reference angle to suit your pedal style. Say 30° for normal riding on both cranks. This will assume that your power peak is at 30° each pedal stroke, so that your waveform has some constancy on the screen. (If you want to see the exact power peak for each pedal stroke – you must install magnets and then you will require to tell the system where your magnets are placed)
- If you do not want to use the various options leave them unmarked. It is much better for battery usage. Waveform and Torque streaming use battery more than simple messaging. Uncheck them after completing your exercise – remember that if you leave them on, your battery usage will be higher than normal.
- If you do want to view the Waveforms or Torque streaming, then turn on the switch for your chosen view. The style-ised T is for Torque, the next one is diagnostic (not needed here), the next is the Waveform, and the final one is to activate magnets if you want to.
- Finally, zero your cranks. Ensure that you are at zero as a result.



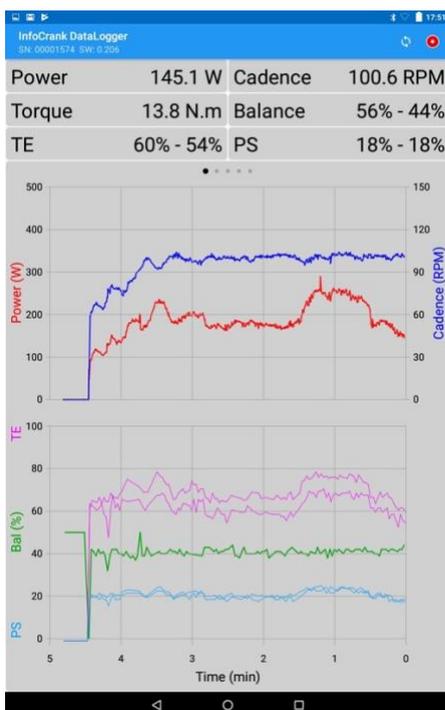


In the example above both the Torque Streaming and the Waveform (includes Polar Graph) is activated.

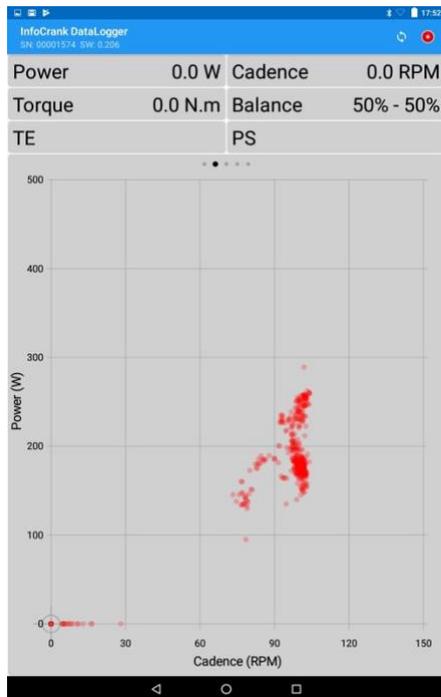
The first two pages are good training and interval pages, particularly for indoor riding.

Page 1 shows all the normal upload data plus the live graph for each matrix. The page width is 5 minutes so you always have your last five minutes showing.

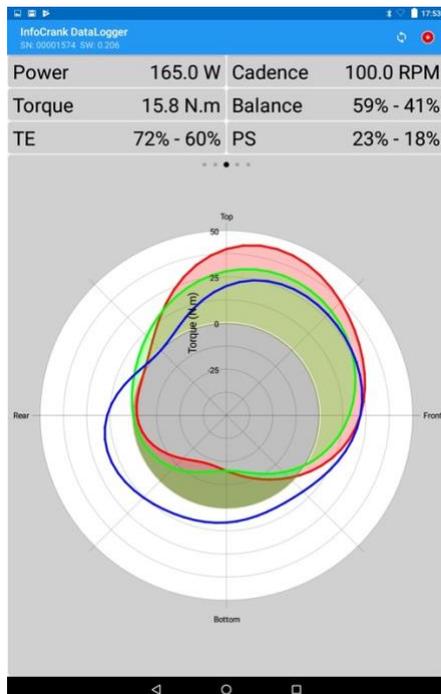
This is particularly useful when you want to do steady work as the line is easier to follow than the numbers. At the same time as your raw power numbers, you also have the pedal balance and Torque Effectiveness (per leg) showing, so you can see the changes as you change power levels.

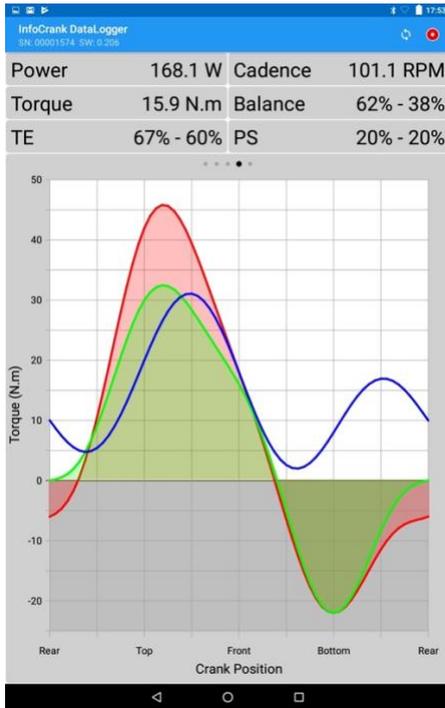


Page 2 is suitable for specific cadence/power work. Each red dot represents a pedal stroke.



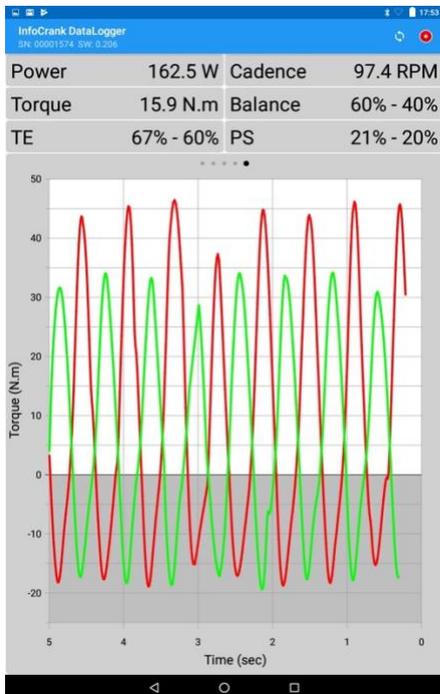
Waveform is represented by both a Polar Graph and the more correct Waveform. Red is the left leg, green is the right and the blue is the combined. There is a zero line to show positive and negative torque. The waveform is very accurate when pedalling constantly and also very timely, so changing your pedal stroke will be very quickly noticed.





Your immediate data remains at the top in every screen. Notice not only the imbalance, but the very different shape of this pedal stroke. These are things to potentially work on.

The Torque Streaming is a feature designed for track use and ultimately of value to both road and MTB riders. In this case, we have time-stamped each torque message without reference to cadence. The actual force applied to the crank can be seen.



We trust that this App is useful to you. It has been used by Team GB and other friends for quite some time, not only within Verve. The data is generally reliable – with some issues

caused by loss of messages in crowded venues or places of very high radio interference. We have built in redundancies for these purposes. The techs at Verve and also British Cycling are continuing to work on the messaging – so that this can be used more and more as a diagnostic and training tool in every environment.

Feel free to share your insights directly to us at [improve@vervecycling.com](mailto:improve@vervecycling.com)

### **More on Bio-Feedback and it's relationship to VINC.**

**Biofeedback** is the process of gaining greater awareness of many **physiological** functions primarily using instruments that provide information on the activity of those same systems, with a goal of being able to manipulate them at will.<sup>[1][2]</sup> Some of the processes that can be controlled include **brainwaves**, **muscle tone**, **skin conductance**, **heart rate** and **pain** perception.<sup>[3]</sup>

Biofeedback may be used to improve health, performance, and the physiological changes that often occur in conjunction with changes to thoughts, emotions, and behavior. Eventually, these changes may be maintained without the use of extra equipment, for no equipment is necessarily required to practice biofeedback - Wikipedia.

In the case of pedalling a bike, with immediate awareness of the pedalling action and changes able to be noted from the visualisations, testers report an ability to change them at will in order to improve their output.

After practice, those same athletes are then able to maintain their new pedalling behaviour without constant reference to VINC.

Case histories include cyclists changing both their pedal balance and wattage output in very short time periods – correcting injuries caused by accidents and faster than normal recoveries. In a number of cases, the problems had been intractable until the cyclist was able to access VINC.

The key appears to be the immediacy and accuracy of the visualisation. (Early models of VINC used wireless links that imposed up to 3 second delays. This delayed loop did not appear to enable timely manipulations by the cyclist.)