phyling.fr

The instrumented crankset

by phyling

Phyling is a specialist in embedded measurement and analysis for sports, research and industry.

Introduction

Phyling's pedal instrumentation allows you to obtain high-frequency (200 Hz) force, speed and power data. This solution allows you to integrate a sensor and an acquisition box into any type of pedal brand or model.

Assembled in our workshops, a precision certificate will be given to you to guarantee a precision of approximately +/- 0.1% force measurement error.

Data can be retrieved in .CSV format directly on the Mini-Phyling acquisition box on your crank. Real-time data visualization and advanced, automated analysis are also available with our Maxi-Hub box and the Phyling application.

Features

- Acquisition frequency: 200 Hz
- Weight: 12g
- Communication : BLE & wired
- Minimum frame-crank space: 15 mm
- autonomy: >4h
- Measurement error: 0.1 %
- Measuring range: -1000 N to +3000 N
- Real-time visualization at 50Hz (with Maxi-Hub)

The Maxi-Hub

The Maxi-Hub is our latest generation acquisition box that allows you to centralize all your data. Use the Phyling application with the Maxi-Hub and analyze the data coming from the pedals.

Many benefits like external sensor sync ports are available. Also cycling specific analysis with many specific indicators, as well as long range real-time visualization with Wi-Fi routers.

It gives you complete control over your data and requires no subscription.

Sensor validation

The Phyling pedalboard was experimentally set up to validate the output data.

Methods

The Phyling sensor data were compared to a reference force sensor. The setup allows the pedal to be dynamically stressed (variable force) up to 1000 Newtons. For this validation, 25 force cycles were applied to both sensors simultaneously.

Statistics

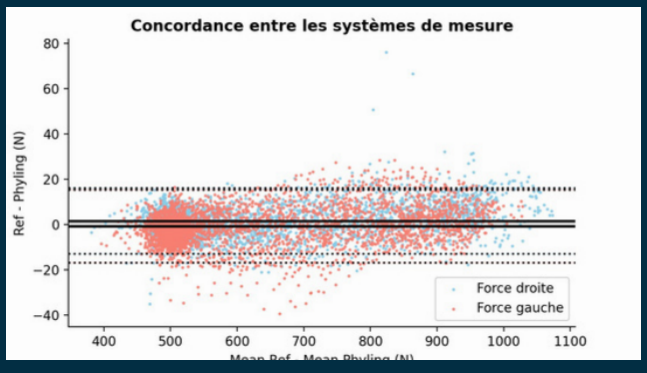
To compare the measurement of the two systems, a Bland Altman analysis was used to identify whether there is an average bias in the measurement. It also allows to identify the limits of agreement (LDC) within which 95% of the errors are included (BA ref). In parallel, the calculation of the intra-class correlation coefficient allows to report the degree of agreement between the two measurement systems (ICC ref).

Results

The phyling crankset shows a very high degree of agreement with the reference sensor. For both cranks (right and left) the ICCs are greater than 0.99. The very low measurement bias and the limits of agreement that represent less than 0.5% of the average measurement are shown in the table and graph below.

Table of statistical values of concordance between the two systems (reference and Phyling)

Valeur	Force	
Indicateur	Fzd	Fzg
Ref moy ± ET	664 ± 38	645 ± 37
Pédalier moy. ± ET	662 ± 38	645 ± 37
ICC (3,1) [95% CI]	**0.99** [1.0, 1.0]	**0.99** [1.0, 1.0]
Diff. moy. (LDC) (lim. basse, lim. haute)	1 .49(-12, 15)	-0.84 (-16,14)
RLDC (%)	**0.23**	**-0.14**



Our advantages

Why you can trust Phyling.

Custom made

Each of our tools is unique and designed according to your requests.

Without subscription

The Phyling app is fully included in the Maxi-Hub.

Raw data

At Phyling you always have the possibility to get the raw data during each exercise.

Personalized follow-up

At Phyling, we support you from the beginning to the end of your project.

Made in France

All our sensors are designed, machined and manufactured in France in our Palaiseau workshops.

Tested to the highest level

Our sensors are used by athletes from more than 15 sports federations

Resources

- Validation of dynamic forces measured by an instrumented crankset

Find these scientific articles and all the information concerning instrumented crankset on our site phyling.fr and in the Resources section

phyling

Web

www.phyling.fr

E-mail

contact@phyling.fr

Linkedin

@phyling

Instagram

@phyling_