



# Virtual Power Meter User Manual

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# Introduction

The Virtual Power Meter is an advanced bike computer application designed for indoor training. Its primary purpose is to enable cyclists to obtain power readings without the necessity of physical power meter hardware. This is achieved through the sophisticated use of ANT+ and Bluetooth Low Energy (BLE) technologies. The app supports a wide array of sensors including Speed, Cadence, combined Speed & Cadence, Heart Rate sensors, and is particularly notable for calculating 'virtual power'—the power output a cyclist generates. This calculation utilizes speed sensor data against a trainer's power curve, enhancing the training experience with fluid and magnetic turbo trainers.

## Hardware and System Requirements

### Compatibility and Installation

Virtual Power Meter can be installed on any Android device that supports ANT+ or Bluetooth LE wireless technologies. The app requires the “ANT+ Plugins Service” for ANT+ functionality, available on the Google Play Store. For BLE, no additional plugins are needed. Detailed instructions for installing the “ANT+ Plugins Service” and ensuring device compatibility for both ANT+ and BLE can be found on the service’s page on the Google Play Store.

For a comprehensive list of phones and tablets that include ANT+ support, please visit [ANT+ in Phones and Tablets](#).

### Sensor Requirements

To fully utilize the Virtual Power Meter, an ANT+ or Bluetooth LE speed sensor or power meter is essential for accurate 'virtual power' and power measurement readings. The app now

supports advanced features through both ANT+ and BLE, promoting broad device compatibility. For detailed information on compatible sensors and power meters, visit the [ANT+ Product Directory](#) and use the filters for 'Bike Speed/Cadence Sensors' and 'Heart Rate Sensors' on the left menu.

## Installation instructions

### Download and Installation

Visit the Google Play Store and search for "Virtual Power Meter" to download the app. Ensure your device is compatible with the app's requirements by referring to the "Hardware and System Requirements" section of this User Manual.

### Setup and Configuration

Once installed, open the app and follow the on-screen instructions to connect your ANT+ or BLE sensors. This setup is crucial for accurate data capture and analysis during your training sessions.

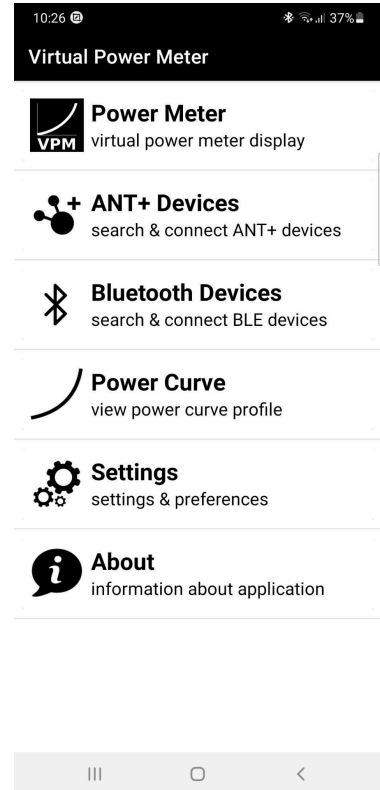
## Main Menu

### Display

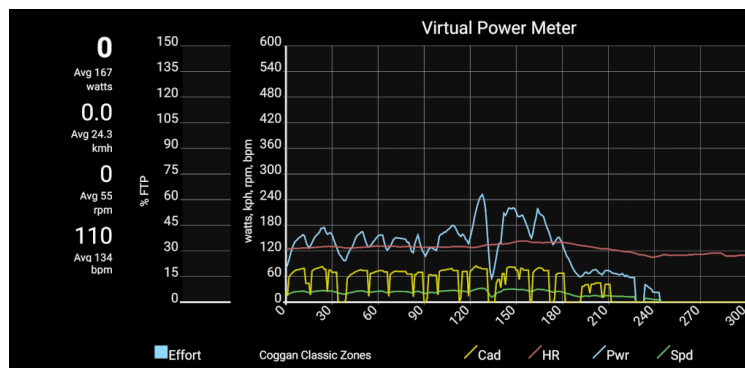
The main activity screen of the Virtual Power Meter app serves as the central hub for all your training data. It presents real-time metrics from connected ANT+ or BLE sensors, offering a detailed view of the following parameters:

- **Speed:** Tracks your cycling speed during the session.
- **Cadence:** Monitors the rate at which you are pedaling.
- **Heart Rate:** Displays your heart rate in real time.

- **Power:** Shows power output readings if a power sensor is connected.
- **Virtual Power Output:** Provides estimated power output based on speed and cadence data when a physical power meter is not used.
- **Connected Sensors List:** This section provides an overview of all ANT+ sensors currently connected to your device. It ensures you are fully aware of which devices are actively transmitting data.
- **Effort Level:** Displays the intensity of your current effort based on sensor data, allowing you to gauge how hard you are working relative to your maximum capacity.
- **Current Power Zone:** Indicates the power zone you are currently operating in, based on your power output readings. Power zones help in segmenting effort levels for targeted training impacts.
- **Power Zones Name:** Names and details each power zone for better understanding and training specificity.
- **Metrics History Graph:** This feature plots a graph of your performance metrics over time. It provides a visual representation of your speed, cadence, heart rate, power, and virtual power throughout your training session, allowing you to analyze trends and make informed decisions about your training strategy.



This interactive display is crafted to give you a comprehensive overview of your training session, enabling you to receive immediate feedback and make adjustments on the fly for optimal performance



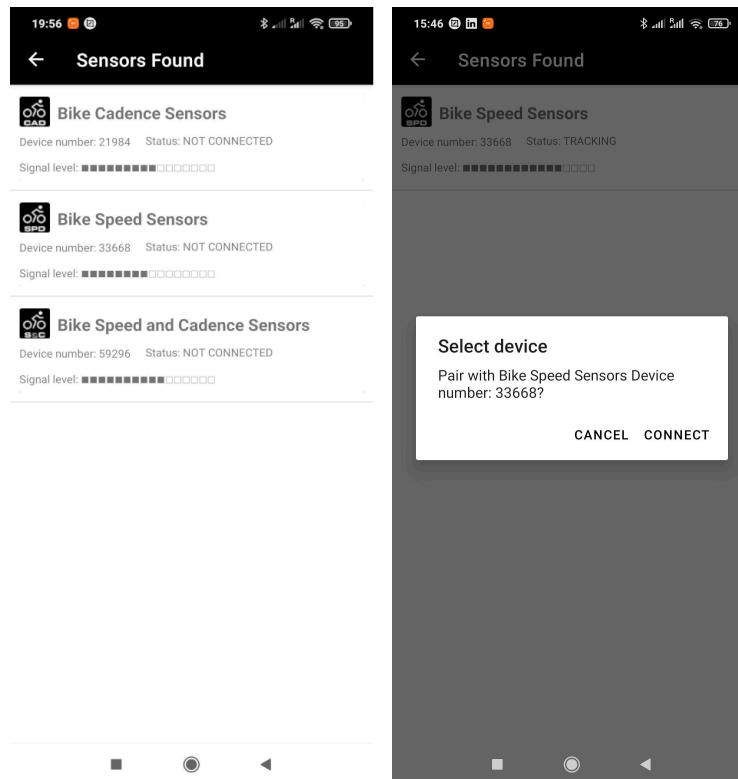
# Sensors

## Device Detection and Connection

This section of the app facilitates the search and display of ANT+ sensors detectable by the application. It provides a user-friendly interface for connecting to these sensors to enhance your training experience.

- **Searching for Sensors:** The app automatically searches for nearby ANT+ sensors. All detected sensors are listed in this view, making it easy to see which devices are available for connection.
- **Connecting to a Sensor:** To connect to a sensor, tap on the sensor you wish to connect from the list. Then, select “CONNECT.” A visual confirmation will appear as shown in the image below. Once a device is successfully connected, the status text next to the sensor will change to “TRACKING.” If the connection is not established, it will display “NOT CONNECTED.”

This functionality is crucial for ensuring that your ANT+ sensors are properly linked and transmitting data to your app, thereby providing accurate tracking and metrics during your indoor training sessions.



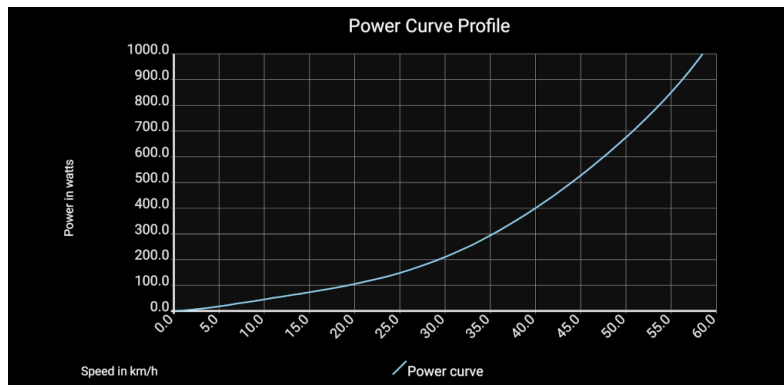
# Power Curve Profile

## Overview of Power Curve Graph

This section of the app displays the power curve graph, a crucial tool for analyzing your cycling efficiency and power output in relation to pedaling speed.

- **Accessing the Power Curve Graph:** Navigate to this section to view the current power curve, as configured within your application settings.
- **Configuring the Power Curve:** You can select a predefined power curve from the settings page tailored to your specific turbo trainer model, or you may choose to manually specify a custom power curve profile. This flexibility allows you to tailor the app to both the specifications of supported turbo trainers and to your personal training needs.
- **Utility of the Power Curve:** The power curve graph provides visual insights into how different speeds influence your power output. This analysis is vital for adjusting training intensity and optimizing strategies, helping you achieve your cycling goals more effectively.

By customizing and reviewing your power curve, you gain a deeper understanding of your performance patterns, enabling you to make precise adjustments for improved training outcomes.

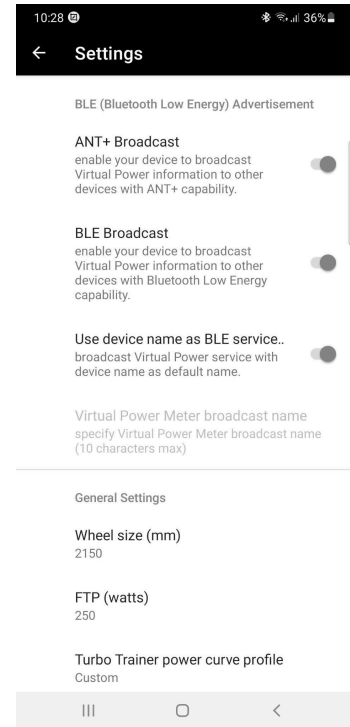


# Settings

## Customization and Configuration

This section of the Virtual Power Meter app allows you to fine-tune a variety of settings to match your training needs and equipment specifications. Proper configuration ensures that the data displayed is accurate and tailored to your personal cycling profile.

- **Power Curve Profile:** Select from a list of predefined power curves that match various turbo trainer models or create a custom power curve. This setting is essential for accurately simulating outdoor cycling conditions indoors.
- **Bike Wheel Size:** Input the size of your bike's wheel. This information is crucial for calibrating the speed and distance measurements, ensuring that the readings are precise.
- **Rider FTP (Functional Threshold Power):** Define your FTP, which is the highest power level you can sustain for an hour. Setting your FTP is vital for calibrating effort levels and effectively utilizing power zones.
- **Power Zones Type:** Choose the type of power zones to be displayed during your training. These zones are based on percentages of your FTP and help in targeting specific training intensities.
- **Additional Parameters:** Adjust other settings such as sensor preferences, display options, and more to enhance your training experience.



Configuring these settings accurately reflects your physical characteristics and training apparatus, providing a personalized and effective indoor cycling experience.

## Enabling and Managing Power Broadcast

The Virtual Power Broadcast (Advertisement) feature in the Virtual Power Meter app allows you to emulate a real power meter using ANT+ and Bluetooth Low Energy (BLE) technologies. This setting is particularly useful for users who wish to integrate the app's virtual power data with other training tools or devices that support power meter input, for example, a bike computer with ANT+ and/or BLE support



- **Enable/Disable Power Advertisement:** Navigate to the **Virtual Power Advertisement** section within the Settings menu. Here, you can toggle the power advertisement feature on or off depending on your training needs and equipment compatibility.
- **Compatibility Check:** In the same section, the app provides a tool to verify whether your device supports ANT+ and BLE advertisements. This check ensures that the power advertisement functionalities will work seamlessly with your device's capabilities.

#### Usage Tips:

- Enabling power advertisement can enhance your training setup by allowing other devices to read the virtual power output from your training session as if it were coming from a traditional power meter.
- Make sure to verify compatibility before enabling this feature to ensure a smooth integration with your existing equipment.

## About

### Application Information

This section of the Virtual Power Meter app provides essential information about the application, ensuring that users can reference details about the software and its development:

- **Version Information:** Displays the current version of the application. This is useful for troubleshooting issues, discussing features with support, or ensuring that you are using the latest updates with all the new functionalities.
- **Application Website URL:** Provides a direct link to the application's official website. Here, users can find more detailed information, support resources, user forums, and additional content about the Virtual Power Meter.

This section is designed to keep users informed about their application version and to provide easy access to comprehensive resources and support.

# Usage example

Before starting your training session with the Virtual Power Meter app, proper configuration is crucial. Follow these steps to ensure the application is tailored to your training setup and preferences.

## 1. Initial Configuration

- Navigate to the **Settings** section and verify all necessary parameters are correctly set according to your training equipment and goals.

## 2. Sensor Connection

- Connect your ANT+ speed sensor and any additional required sensors via the **ANT+ Devices** menu. Details on connecting sensors can be found in the "ANT+ Devices" section of this manual.

## 3. Bike Wheel Size Configuration

- In the **Settings** menu, set your bike wheel size to ensure that the speed readings on the app match those on your bike computer. If discrepancies arise, adjust the bike wheel size in the Settings menu to align with your bike computer readings.

## 4. Power Curve Configuration

- Access the **Power Curve Profile** section in the Settings menu. By default, the power curve for a Lifeline TT-02 Fluid Trainer is configured. To customize the power curve, input comma-separated strings representing power values at speeds of 10, 20, 30, 40, 50, and 60 km/h. For fewer speeds (e.g., 10, 20, 30, 40 km/h), a configuration string might look like '45,105,210,400'. If you own a power meter, calibrate the Power Curve using power readings from your regular bike computer. Review and adjust your power curve settings as needed.

## 5. Finding Power Curves Online

- If you do not have a power meter and your turbo trainer differs from the default, search online for the power curve specifications that correspond to your trainer model.

## 6. Functional Threshold Power (FTP) and Training Zones

- Configure your FTP and Training Zones in the Settings menu. Setting your FTP is essential for accurately calculating effort levels and training effectively within your capacity.

## 7. Starting Your Training Session

- From the main menu, open the **Power Meter Display**. The app will connect to the configured sensors. Once connected, you are ready to begin your training session.

### Note on Power Accuracy

- Please note that the Virtual Power Meter calculates power based on the power curve and speed. Factors such as consistent wheel pressure and the pressing force of the indoor trainer's roller can affect power measurements. While exact power readings are

not guaranteed, the app provides sufficiently accurate power data for effective training sessions without a physical power meter sensor.

## Troubleshooting

### Support and Feedback

As the Virtual Power Meter application continues to evolve, we are committed to enhancing your indoor training experience with new features. Your feedback is invaluable to us as it helps improve the app's functionality and user experience.

- **Reporting Issues:** If you encounter any issues or have suggestions for improvements, please do not hesitate to contact the application developers. We welcome your comments and are here to assist you in resolving any problems.
- **Contact Information:** For inquiries, support, or to provide feedback, please visit our website for the most current contact details <https://virtualpower.app> or send an email to [virtualpowermeter@gmail.com](mailto:virtualpowermeter@gmail.com).

We appreciate your support and patience as we work diligently to refine the app and introduce new features.