

# FingerTPS II

## User Manual Configurable Hand and Finger Force Measurement System

## INTRODUCTION AND PRODUCT OVERVIEW

For product designers and researchers who work to optimize product ergonomics by quantifying user interactions, PPS's Finger Tactile Pressure Sensing (FingerTPS™) System is the ideal measurement tool.



The FingerTPS™ System utilizes highly sensitive capacitive-based pressure sensors to reliably quantify forces applied by the human hand on objects.

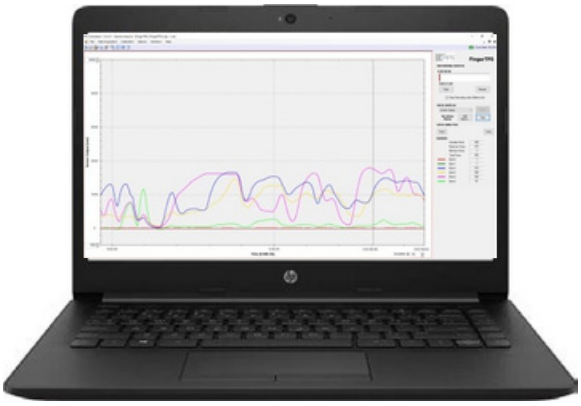
Along with its comfortable and slim design, FingerTPSTM uses wireless Bluetooth® connectivity to enable more natural operation without cumbersome wiring.



When used with PPS's powerful Chameleon™ Tactile Visualization and Recording (TVR) software, the FingerTPS™ System can be easily reconfigured and recalibrated for different uses of the hands on the fly.

## ChameleonTM Tactile Visualization and Recording (TVR) Software

PPS's Chameleon™ Tactile Visualization and Recording (TVR) software is a pressure imaging solution providing intuitive, easy to use, high quality pressure mapping visualization.
Precise force data and video images can be captured, exported, and analyzed in real-time, or saved and replayed for analysis on a later date.



# Features & Applications

## KEY FEATURES

+ Minimal set-up and configuration
+ Conformable, lightweight and comfortable sensors
+ Compact, wireless Bluetooth® connectivity
+ Simple calibration and configuration
+ User configurable
+ API available

## KEY BENEFITS

+ Minimally-intrusive, comfortable tactile sensors closely match human interactions.
+ Capture reliable, repeatable data even over curved surfaces
+ Ability to test one-handed or two-handed operations
+ Easy to incorporate into various tasks

The system comprises a series of sensors of various sizes. These sensors connect to the signal-conditioning Wrist Module (connects up to 6 sensors), which is then connected to the rechargeable electronics interface module.

This module then connects wirelessly over Bluetooth® to the computer running PPS's ChameleonTM TVR software for live data capture and processing.

The FingerTPS™ System can be applied in nearly any application where forces exerted on the hand or by the hand need to be measured.



Rehabilitation and occupational therapy



Human factors and ergonomics product testing



User interaction testing in industrial design



Worker safety assessment



Physiology and musculoskeletal research



Athletic, fitness, or sports performance assessment

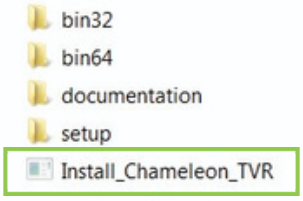
## SYSTEM COMPONENTS

1. FingerTPS Sensors (Two Supplied)
2. BLE Module and Housing
3. BLE USB Dongle
4. Wrist Module
5. Reference Sensor
6. Webcam
7. Charging Cable

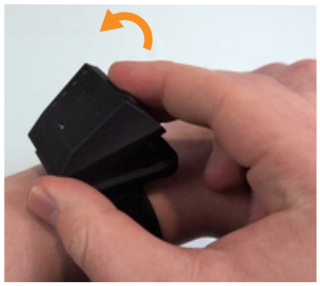



## INITIAL SETUP

1. Install Chameleon
2. Plug BLE USB Dongle into USB Port on PC
3. Connect BLE Module to glove
4. Press switch on BLE Module to turn on system







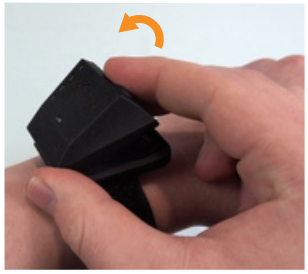
## DATA COLLECTION

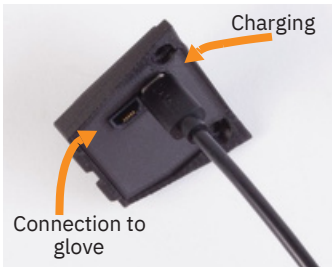
5. Launch Chameleon and select desired configuration
6. Collect data with Chameleon, save files, and then exit software
7. Press switch on BLE Module to turn off



## RECHARGING AND STORAGE

8. Remove BLE Module
9. Insert microUSB end of USB Charging Cable into BLE Module to recharge internal battery via PC
10. Store FingerTPS in provided case when not in use.






## LED NOTIFICATIONS




| System State | LED Actions | User Action |
|---|---|---|
| In power up mode after Power Button pressed once | Battery Level LEDs flash once, then Status LED turns solid GREEN | Initiatlization complete. Start Chameleon on PC |
| While waiting for Chameleon to connect | Battery Level LEDs indicates battery charge. Status LEDs remains solid GREEN. | Start Chameleon on PC (Device powers off if Chameleon connection not established within 5 minutes) |
| While connected to Chameleon | Status LED flashes GREEN every second. Battery Level LEDs flashes every 5 seconds. | Chameleon is connected and recording data |
| Lost connection to Chameleon | Status LED is solid RED | Power-cycle BLE Module and initiate reconnect to Chameleon |
| BLE Module connection error | Status LED flashes RED | Check BLE Module is seated properly, then power-cycle Module |
| Charging battery via USB cable | Bottom Battery Level LED is solid | Press power switch to check charging progress. Wait for charging to complete |
| Battery charging complete while USB cable plugged in | Bottom Battery Level LED is off. If power switch is pressed, then all Battery Level LEDs should turn solid | Disconnect charging cable |
| Turn off after Power Button pressed once | All LEDs are off | Remove BLE Module from system |

# Technical Specifications

## SENSOR MODELS AND METRICS

### Sensor Characteristics & Performance

| | |
|---|---|
| SensFinogr cEele | 2 kg |
| Rmaenngtes Sensitivity | 0.1% |
| Thickness | ~ 2 mm > |
| Signal-to-Noise (SNR) | 500:1 |
| Gain Non-Repeatability | < 3% |
| Linearity | > 98% |
| Minimum Sensitivity | 0.04 N |
| Mass | 55 g |

### Electronic Specifications

| | |
|---|---|
| Scan Rate | 25 - 40 Hz |
| Interconnection | Wireless BlueTooth Low Energy (BLE) - maximum 5 m range |
| Battery Life | > 2 hours |
| Operating Temperature | 5 - 40 ˚C |
| Voltage | 3.7 V |
| Battery Capacity | 250 mAh |

[1]Performance numbers are for typical system response.

### Environmental Conditions

| | |
|---|---|
| Pollution Level | Pollution Degree 2 |
| Humidity | > 30% and < 50% |
| Altitude | < 2000 metres |
| Storage Temperature | > 3 °C and < 60 °C |

## SYSTEM CARE

+ Dry wipe clean - do not use chemicals
+ No maintenance needs to be performed on the system
+ Device is non-user repairable - contact PPS if there are issues
+ While charging keep device accessible
+ Use in a dry environment
+ Store in protective case when not in use
+ 2 hours of use when charged - 2 hours to charge

## FAQs

1. How many sensors come with a purchase of a FingerTPSTM System?

   Your choice of any two finger sensors come with one system. You may order additional finger sensors.

2. Where is the sensing elements located on the finger sensors?

   The sensing elements are located in an oval shape at the bottom fingertip of each sensor. No sensing elements are located on the back of the sensor.

3. You say this is wireless but there are wires on the FingerTPSTM System?

   The system is wireless in that it does not need to be connected to the computer via wires. The system connects to the computer over Bluetooth®.

4. What is the wireless Bluetooth® range of the FingerTPSTMSystem?

   You can use the system up to 5 meters from the computer in which the Bluetooth® dongle is attached.

5. Is the FingerTPSTM System one-size fits all?

   The sensors are offered in various sizes from XS to L. Please refer to the FingerTPS Sizing Chart (page 9) to determine the best sized finger sensor for you.

**CONTACT US**

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support@pressureprofile.com.cn
www.pressureprofile.com.cn

## SAFETY INSTRUCTIONS

+ The sensors are not cut-proof - do not use it as such.
+ Not suitable for holding hot equipment.
+ Do not use around flame.
+ Do not overcharge or use third party connectors/chargers.
+ Does not contain hazardous substances.
+ FingerTPS is of minimal risk to the user.

WARNING: Do not drop, disassemble, open, crush, deform, puncture, shred or microwave FingerTPS. Do not insert foreign objects into any opening on the FingerTPS module, such as the micro-USB port. Do not use FingerTPS if it has been damaged—for example, if cracked, punctured, or harmed by water. Disassembling or puncturing the integrated battery can cause an explosion or fire.

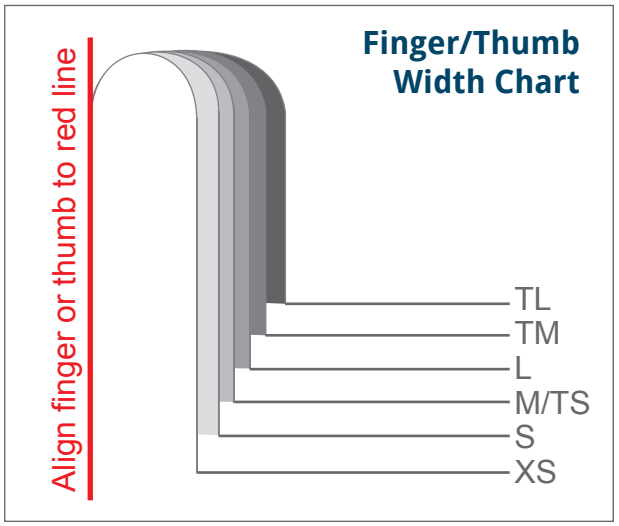
## STANDARDS MET

+ EN 61010-1
+ IC60417-5031 (2002-2010)

# FingerTPS™ Sizing Chart

1. Print this page at 100% (do not scale or fit to page). Check scaling with ruler.
2. Determine hand size by measuring knuckle width on hand diagram at right.
3. Use recommended sensor sizes based on Hand Size Table or match finger/thumb to sensor sizes using the Finger/Thumb Width Chart below.




## Hand Size Table

| Hand Size | Thumb | Index | Middle | Ring | Pinky |
|---|---|---|---|---|---|
| S | TS | S | M | S | XS |
| M | TM | M | L | M | S |
| L | TL | L | L | L | M |

