

PulsePen® The Arterial Tonometer



Pulse Wave Velocity
Central Blood Pressure
Pulse Wave Analysis

Wireless System

PulsePen is available in two models:

WPP001-ETT: 2 Tonometers + ECG + USB wireless receiver

WPP001-ET: 1 Tonometer + ECG + USB wireless receiver

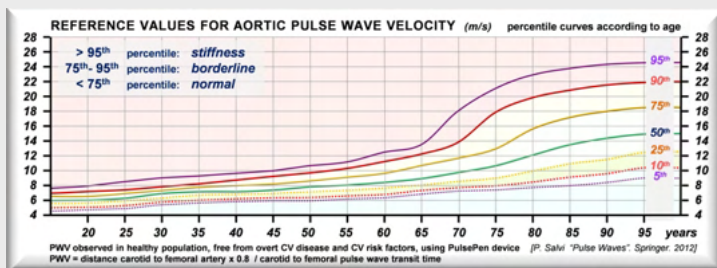
PulsePen is a class IIa, medical device, CE marked and certified according to the 93/42/CEE Directive: certificate n. 1878/MDD - Annex II, which involves all stages from design to final inspection and testing.

Designed and manufactured in Italy, for both clinical practice and applied research.

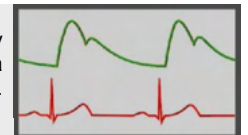
Pulse Wave Velocity

WPP001-ETT and WPP001-ET models:

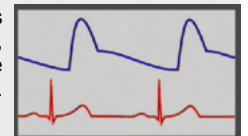
- Measurement of Pulse Wave Velocity using an arterial tonometer is the non-invasive gold standard method to assess arterial stiffness.
- PulsePen system records pulse waves employing only high-fidelity tonometers, without cuffs.



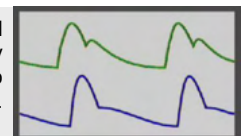
Pulse Wave Velocity is obtained by determining the pulse wave transit time in a certain arterial segment.



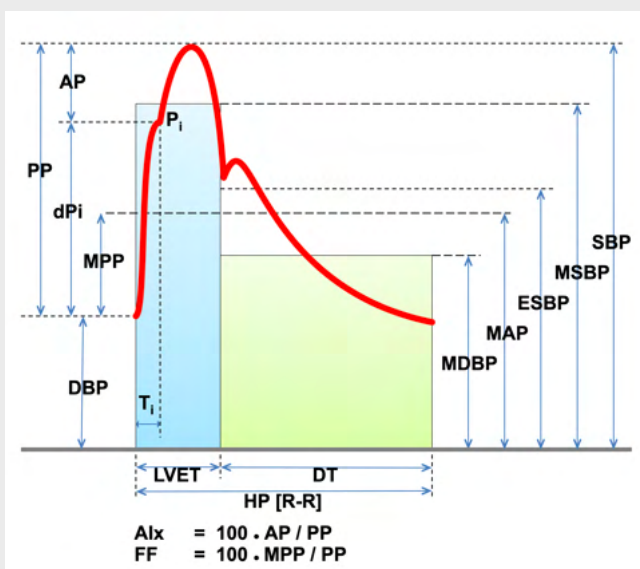
WPP001-ET and **WPP001-ETT** models measure the Pulse Wave Velocity in two stages, using the R wave of the qRs complex of the ECG as reference.



The two tonometers of the **WPP001-ETT** model allow measurement of the PWV by simultaneously recording pulse waves in two arterial sites.



Pulse Wave Analysis



Central Systolic Blood Pressure (cSBP)

Central Pulse Pressure (cPP)

Mean Arterial Pressure (MAP)

Amplification Phenomenon

Form Factor (FF)

Augmentation Index (Aix)

Global Reflection Coefficient (GRC)

Pulse Wave Separation Analysis

Early Systolic Pulse Wave Slope

Pulse Pressure Variability

Heart Rate Variability

End Systolic Blood Pressure (ESBP)

Mean Systolic Blood Pressure (MSBP)

Mean Diastolic Blood Pressure (MDBP)

Isometric Contraction Time (ICT)

Pre-Ejection Period (PEP)

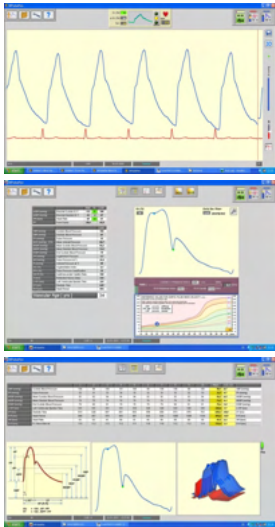
Left Ventricular Ejection Time (LVET)

Diastolic Time (DT)

Real SubEndocardial Viability Ratio (SEVR)

PulsePen® The Arterial Tonometer

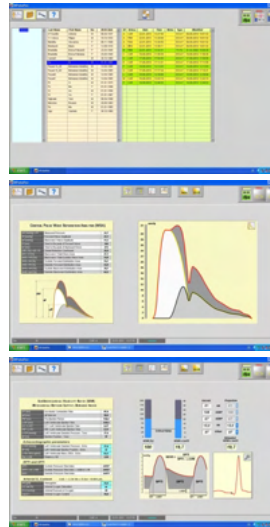
Complete Software Suite



- Recording of 10 cardiac cycles (default)
- Long recordings (up to 24 hours with LP_software included)
- Real time display of the signal quality index

- Pulse Wave Velocity
- Pulse Wave Analysis
- Central Blood Pressure
- Vascular Age
- Automatic Report generation

- Cycle by cycle verification of the parameters
- 3D representation
- Integrated Help and Tutorial



- Patient database management
- Import / Export of exams
- Raw data export of curves as text file
- Automatic export of all parameters to spreadsheet
- Central Forward / Backward Pulse Wave Separation Analysis

- Advanced SEVR estimation (O₂ supply / demand ratio at subendocardial level)
- SEVR x CaO₂ assessment
- SEVR x CaO₂ projection
- Ejection Fraction estimation

PulsePen Holder accessory



Carotid artery

Femoral artery

Radial artery

- Mechanical arm for the tonometer probe
- It allows recording of stable signals, free from artifacts relating to involuntary muscular tremor and variations on applied pressure
- It allows the use of two tonometers simultaneously with a single operator (mod. WPP001-ETT)
- Ability to record the pressure signal, continuously, for long time periods

Technical Specifications

Capture: 16 bit
 Sampling rate: 1000 S/sec
 Wireless: ISM @ 2.4 GHz
 Batteries: Alkaline AAA - 1.5V IEC LR03 (≥ 50 hours / ≥ 600 exams)
 Ambient Temperature: +5°C → +40°C
 Transport and storage Temperature: -25°C → +70°C
 Relative Humidity: 30% → 80% non cond.
 Atmospheric Pressure: 860 → 1060 hPa (tested at 5400 m a.s.l.)

Tonometry Unit
 Resolution: 0.004 mmHg
 Differential Range: ≥ 220 mmHg
 Max Shock: ≤ 150 g
 Max Vibration: ≤ 20 g @ 10 Hz → 2 KHz sinusoidal
 Dimensions [mm]: 114 (L) x 25 (W) x 20 (H)
 Weight: 25 g (without battery)

ECG Unit
 Resolution: 0.15 μV
 Range: ≥ ± 5 mV
 Max Vibration: ≤ 20 g @ 10 Hz → 2 KHz sinusoidal
 Dimensions [mm]: 49 (L) x 75 (W) x 21 (H)
 Weight: 36 g (without battery)

USB Wireless Signal Receiver
 Dimensions [mm]: 67 (L) x 25 (W) x 11 (H)
 Weight: 12 g

PC (recommended configuration)
 Clock Frequency ≥ 2GHz
 Ram Memory ≥ 2 GB
 Free Hard Disk space ≥ 4.5 GB SW + DataBase
 Graphic Resolution ≥ 1280 x 800, 24 bit color
 Operating System: Windows® XP SP2/3, Vista, 7, 8, 10 - 32/64 bit
 USB ports ≥ 1

Why choose PulsePen:

- In the assessment of PWV and pulse waveform analysis, PulsePen employs only pressure sensors (tonometers), without cuffs, based on the international recommendations for arterial stiffness estimation.
- Easy recording of the aortic PWV with average running time less than 3 minutes.
- Validated assessment of central hemodynamic parameters directly based on carotid (central) recording of the pressure waves, without using any "transfer function".
- The PulsePen captures the pressure and electrocardiographic signals at high definition (16 bit) and high sampling rate (1000 Hz).
- Starting from the first model of 2004, PulsePen has been used in numerous clinical and epidemiological studies involving more than 30 thousand patients all over the world.
- More than 150 scientific publications on prestigious international journals (indexed by Scopus and Web of Science) refer to studies in which PulsePen was used.
- The reference values of aortic PWV in the pediatric age have been defined using the PulsePen system.
- PulsePen allows the estimation of the real balance between subendocardial oxygen supply and demand (SEVR), taking into account parameters ignored by other systems (such as isovolumic contraction, isovolumic relaxation and diastolic ventricular pressure).
- The original wireless system allows maximum freedom of movement for the operator.
- The system includes a mechanical holder for stable and artifact-free signal capture.
- Best performance in terms of signal quality and stability with the lowest variability among similar devices.
- Designed and certified for use in the daily clinical practice (speed of execution, qualitative evaluation of the signal, automatic reporting) and in the clinical applied research (advanced morphologic analysis of pressure wave, export of parameters to spreadsheet and much more...).
- Pocket size dimensions. Total system weight less than 100 g.
- No fees for consumables or periodic updates. Free software upgrades.
- Competitive price compared with other tonometer instruments on the market.



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