

proceq

PUNDIT® PL-200
ULTRASONIC PULSE VELOCITY

PUNDIT® PL-200PE
ULTRASONIC PULSE ECHO





pundit

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WORLD PREMIERE

PUNDIT® TOUCHSCREEN UNIVERSAL

Proceq – History of Innovation since 1954

Proceq SA of Switzerland, founded in 1954, is a leading manufacturer of the highest quality portable instruments for non-destructive testing of materials. The ubiquitous Original Schmidt concrete test hammer and the patented SilverSchmidt (Q-value) are just an excerpt of Proceq's proud inventions.

Industry Standard Pundit

Pundit is a de facto industry standard brand and widely recognized as the first commercial field (on-site) device to measure Ultrasonic Pulse Velocity. Proceq acquired Pundit in 2009 and later launched the popular Pundit Lab and Pundit Lab+.

New Pundit Touchscreen

The **Pundit PL-200** and **Pundit PL-200PE** continue the illustrious Pundit tradition that began in the 1970s. They are the first Proceq products to be developed using a new generation and design-protected Touchscreen Unit.



- ✓ Housing specially designed to be used on-site in harsh environments
- ✓ Screen with highest resolution and sharpest image available in the market allowing best possible analysis of the measured waveforms
- ✓ 8 GB Flash memory allowing storage of up to 100'000 A-Scans
- ✓ Dual core processor supporting diverse communication and peripheral interfaces
- ✓ Modular concept: Expandable with all Proceq Pulse Velocity and Pulse Echo transducers
- ✓ Future proof investment: upcoming Pundit ultrasonic products will be directly compatible

Applications Overview

| Pundit PL-200 | Pundit PL-200PE |
|--|--|
| Through Transmission: Access from two sides | Pulse Echo: Single side access |
| | |
| Assessment of Concrete Quality | |
| Ultrasonic Pulse Velocity | |
| Uniformity | |
| Compressive strength and SONREB | Slab thickness from a single side |
| Determination of crack depth | Detection and localization of voids, pipes, cracks (parallel to surface), and honeycombing |
| Modulus of elasticity | |
| Scan Modes | |
| A-Scans Line Scans | A-Scans B-Scans |

- ✓ Never before has the user had such a control over the measurement procedure in real time directly on-site!



PUNDIT® PL-200

ULTRASONIC PULSE VELOCITY

Pundit PL-200 – The new Benchmark for Ultrasonic Pulse Velocity Testing

Best-in-class Ultrasonic testing instrument providing superior features for on-site testing:

- ✓ Line Scans for concrete uniformity assessment
- ✓ Zoom and scroll for precise A-Scan inspection
- ✓ On board storage and review of waveforms
- ✓ Settings directly accessible on measuring screen
- ✓ Dual cursor for manual A-Scan evaluation
- ✓ Separate cursor to measure signal amplitude
- ✓ Improved surface velocity measurement
- ✓ Automatic and manual triggering and user adjustable trigger threshold
- ✓ A-Scan update rate up to 25 Hz
- ✓ Expandable with Pundit Pulse Echo transducer



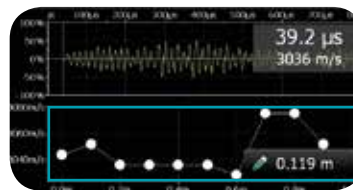
Ordering Information Pundit PL-200

Part Number: 327 10 001

Consisting of: Pundit Touchscreen, 2 Transducers 54 kHz, 2 BNC cables 1.5 m, couplant, calibration rod, BNC adapter cable, battery charger, USB cable, DVD with software, documentation, carrying strap and carrying case

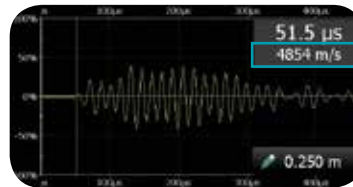
Comprehensive Measurement Modes

Line Scans



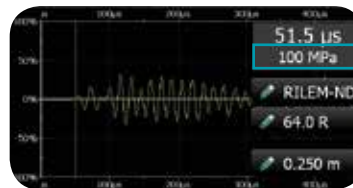
Assesses the concrete uniformity and detects cracks as well as other defects. The measured pulse velocities are displayed as a line.

Pulse Velocity



Calculates the pulse velocity of the material under test.

Compressive Strength



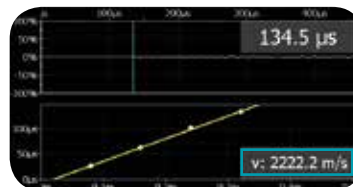
Determines the compressive strength using Ultrasonic Pulse Velocity correlation, or by using SONREB.

Crack Depth



Determines the depth of perpendicular cracks according to BS 1881.

Surface Velocity



Determines surface velocity according to BS 1881.

Transmission Time: Measures the transmission time.

Distance: Calculates the distance between the transducers.






Standards and Norms: EN12504-4 (Europe), ASTM C 597-02 (North America), BS 1881 Part 203 (UK), ISO1920-7:2004 (International), IS13311 (India), CECS21 (China).

PUNDIT® PL-200

ULTRASONIC PULSE VELOCITY

Pulse Velocity Transducers

Proceq offers an extensive range of transducers providing highest accuracy and a proven field track record. The selection of the correct transducer is dependent on the aggregate/grain size and the dimensions of the test object.

| Bandwith and aperture size | Image | Test Object Limitations | | | Applications |
|----------------------------------|---|-------------------------|--------------------|---|--|
| | | Wavelength* | Maximum grain size | Minimum lateral dimension | |
| P-wave Transducers | | | | | |
| 24 kHz Ø50 mm x 95 mm |  | 154 mm | ≈ 77 mm | 154 mm | » Concrete: Very coarse aggregate and large objects (several meters) |
| 54 kHz Ø50 mm x 46 mm |  | 68.5 mm | ≈ 34 mm | 69 mm | » Concrete » Wood » Rock |
| 150 kHz Ø28 mm x 46 mm |  | 24.7 mm | ≈ 12 mm | 25 mm | » Fine grained material » Refractory bricks » Rock (NX cores) |
| 250 kHz Ø28 mm x 46 mm |  | 14.8 mm | ≈ 7 mm | 15 mm | » Fine grained material » Refractory bricks » Rock » Use on small samples |
| 500 kHz Ø57 mm x 32 mm |  | 7.4 mm | ≈ 3 mm | 7 mm | » Fine grained material » Refractory bricks » Rock » Use on small samples |
| 54 kHz Ø50 mm x 100 mm |  | 68.5 mm | ≈ 34 mm | 69 mm | » Concrete: Rough and rounded surfaces (no couplant required) » Wood » Rock (heritage sites) |
| S-wave Transducer | | | | | |
| 250 kHz Ø41 mm x 32 mm |  | 10 mm | ≈ 5 mm | Greater than the thickness of the object. | » Used for determination of elastic modulus » Concrete, wood, rock (small samples only) » Requires special shear wave couplant |

*A pulse velocity of 3700 m/s (longitudinal wave) and 2500 m/s (shear wave) have been used for the computation of the wavelengths.

PUNDIT® PL-200PE

ULTRASONIC PULSE ECHO

Pundit PL-200PE – Groundbreaking Ultrasonic Pulse Echo Testing

The Pulse Echo technology widely extends the application range of the Pundit Touchscreen Unit and offers a variety of special features:

- ✓ **Single side determination of slab thickness**
- ✓ **Detection and localization of voids, pipes, cracks (parallel to surface) and honeycombing**
- ✓ **Advanced echo tracking technology helps identifying the main echo**
- ✓ **Control buttons and optical feedback directly on the probe increase measurement efficiency**
- ✓ **Automatic estimation of the Pulse Velocity**
- ✓ **Easy B-Scan measuring through center marker and rulers directly on the probe**
- ✓ **Dry-contact transducer: no couplant required, suited for measuring on rough surfaces**
- ✓ **Lightweight and ergonomical handling**
- ✓ **Expandable with Pulse Velocity transducers**



Ordering Information Pundit PL-200PE

Part Number: 327 20 001

Consisting of: Pundit Touchscreen, Pundit Pulse Echo Transducer incl. cable, contact tester, battery charger, USB cable, DVD with software, documentation, carrying straps and carrying case

Scan Modes

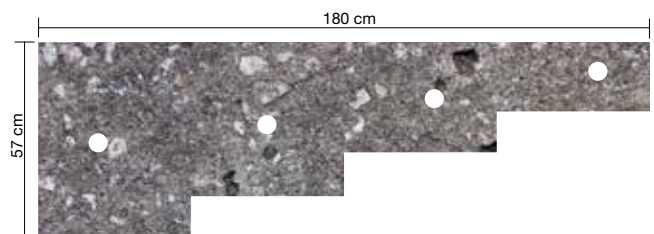
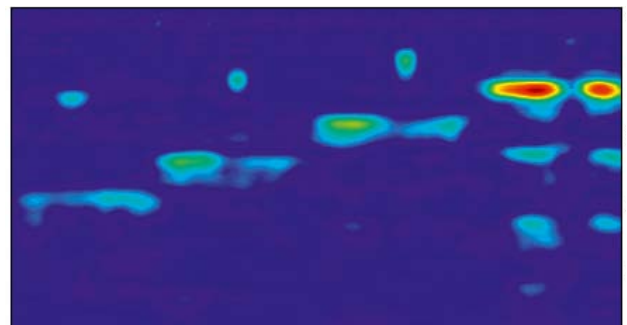
A-Scan

- » A-Scan allows direct analysis of the raw signal.
- » Digital filters for better echo visibility and noise suppression.
- » Automatic readout of slab thickness (Echo tracker).

B-Scan

- » A cross-sectional view perpendicular to the scanning surface is provided. It facilitates the search for pipes, cracks, voids, etc.
- » State-of-the-art image processing for improved image quality.
- » Cursor placement allows a direct readout of the slab thickness and the location of hidden objects or defects.

Example: B-Scan of a concrete object containing steel pipes:



Center marker and rulers directly on the transducer help generating the B-Scan:



PUNDIT® PL-200PE ULTRASONIC PULSE ECHO

Pulse Echo Transducer

The Pulse Echo transducer is a shear wave transducer designed for single-handed and two-handed operation. It is particularly suited to testing where access is limited to a single side.

| Bandwidth and aperture size | Test Object Limitations | | | | |
|--------------------------------|-------------------------|--------------------|---------------------------|---|---------------------------|
| | Wavelength* | Maximum grain size | Minimum lateral dimension | Penetration depth | Minimum object detectable |
| 50 kHz 2x25 cm ² | 50 mm | 50 mm | 2x thickness | Typically 500 mm (up to 1000 mm under ideal conditions) | 30 mm air cylinder |

*A pulse velocity of 2500 m/s has been used for the computation of the wavelength.



Expert Ultrasonic Training

Testing with the Pulse Echo technology requires in-depth knowledge of the test object and application characteristics. Proceq offers comprehensive ultrasonic training seminars imparting this knowledge as well as all functionalities and features of the Pundit instruments. Pundit PL-200PE customers are recommended by Proceq to register for the **Advanced Ultrasonic Tomography Applications** training. See details on the next page.



On successful completion of the **Advanced Ultrasonic Tomography Applications** training, Pundit PL-200PE customers get access* to „Ask Malcolm“, a global Application Support Service provided by a team of renowned experts who have years of hands-on, on-site NDT inspection expertise.

*Terms and conditions apply.

NDT Concrete Ultrasonic Training Concept


Proceq’s training modules are strongly focused on a practical approach to routine testing of in-situ concrete quality using the **Pundit range of ultrasonic products**.

Training facilities are located at Proceq headquarters in Schwerzenbach (Switzerland), Chicago (USA), Singapore and London (UK). All training modules are conducted in English (German, French and Spanish can be organized on demand).

Training fees include all necessary training material and documentation and exclude all travel, accomodation and meal. Course dates are determined by Proceq. Please contact your local Proceq representative.

| Essentials of Non-Destructive Testing (NDT) of Concrete using Ultrasonic Methods | | | | |
|---|--|----------|--|------------|
| Description | Prerequisites | Duration | Locations | Course No. |
| Characteristics of concrete; overview of NDT methods; ultrasonic pulse velocity principles and methods for assessing compressive strength of concrete, detecting voids and cracks; transducer types; product and practical training (Pundit Lab, Pundit Lab+, Pundit PL-200). | Any technical background or prior experience with NDT products will allow quicker and deeper comprehension of the course material. | 2 days | <ul style="list-style-type: none"> Schwerzenbach (Zuerich, Switzerland) Chicago (United States of America) Singapore London (United Kingdom) | 970 00 300 |

| Advanced Ultrasonic Tomography Applications | | | | |
|--|--|----------|--|------------|
| Description | Prerequisites | Duration | Locations | Course No. |
| NDT ultrasonic methods to evaluate concrete from a single surface; using tomography to detect air filled voids and cracks; locate structural elements, pipes, ducts and honeycombing. Product and practical training (Pundit PL-200PE); detailed review and interpretation of specific tomographic application examples. | Participants are expected to be experienced NDT users, any on-site ultrasonic experience will allow a focused discussion on specific application issues. | 2 days | <ul style="list-style-type: none"> Schwerzenbach (Zuerich, Switzerland) Chicago (United States of America) Singapore London (United Kingdom) | 970 00 400 |

| Application Support Service | Prerequisites | Access |
|--|--|----------------|
|  <p>“Ask Malcolm” is an Application Support Service provided by Proceq to owners and users of the PL-200PE who have completed the corresponding advanced training module. It is supported by a team of renowned experts who have years of hands-on, on-site NDT inspection expertise.</p> | Purchase of a PL-200PE; Completion of the module “Advanced Ultrasonic Tomography Applications” with course no. 970 00 400 | Proceq website |

PUNDIT PL-200 ULTRASONIC PULSE VELOCITY

PUNDIT PL-200PE ULTRASONIC PULSE ECHO

Ordering Information

Units

| PART NO. | DESCRIPTION |
|------------|--|
| 327 10 001 | Pundit PL-200 |
| 327 20 001 | Pundit PL-200PE |
| 327 10 002 | Pundit Touchscreen without transducers |

Supplementary Transducers

| | |
|-------------|--|
| 325 40 026S | 2 Transducers 24 kHz |
| 325 40 131S | 2 Transducers 54 kHz |
| 325 40 141S | 2 Transducers 150 kHz |
| 325 40 177S | 2 Transducers 250 kHz |
| 325 40 175S | 2 Transducers 500 kHz |
| 325 40 176 | 2 Exponential Transducers 54 kHz, incl. calibration rod |
| 325 40 049 | 2 S-Wave Transducers 250 kHz, incl. couplant |
| 327 40 130 | Pundit Pulse Echo Transducer, incl. cable and contact tester |

Accessories

| | |
|------------|---|
| 327 01 043 | Carrying strap complete |
| 325 40 150 | Transducer holder complete |
| 327 01 049 | BNC adapter cable for Pundit PL-200 |
| 325 40 021 | Cable with BNC-plug, 1.5 m (5 ft) |
| 325 40 022 | Cable with BNC-plug, 10 m (33 ft) |
| 710 10 031 | Ultrasound couplant, 250 ml |
| 325 40 048 | Shear wave couplant, 100 g |
| 327 01 033 | Battery complete |
| 327 01 053 | Quick charger (external) |
| 710 10 028 | Calibration rod 25 μ s for Pundit PL-200 |
| 710 10 029 | Calibration rod 100 μ s for Pundit PL-200 |

Subject to change without notice. All information contained in this documentation is presented in good faith and believed to be correct. Proceq SA makes no warranties and excludes all liability as to the completeness and/or accuracy of the information. For the use and application of any product manufactured and/or sold by Proceq SA explicit reference is made to the particular applicable operating instructions.

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Technical Specification

| | Pundit PL-200 | Pundit PL-200PE |
|-----------------------|--|-------------------|
| Range | 0.1 – 7930 μ s | |
| Resolution | 0.1 μ s (< 793 μ s), 1 μ s (> 793 μ s) | |
| Display | 7" colour display 800x480 pixels | |
| Pulse Voltage | UPV | 100 – 450 Vpp |
| | UPE | – 100 – 400 Vpp |
| Bandwidth | 20 – 500 kHz | |
| Receiver Gain | 1x – 10'000x (0 – 80dB) [11 steps] | |
| Memory | Internal 8 GB Flash memory | |
| Regional Settings | Metric and imperial units and multi-language supported | |
| Battery | Lithium Polymer, 3.6 V, 14.0 Ah | |
| Battery Lifetime | > 8h (in standard operating mode) | |
| Operating Temperature | 0°C – 30°C (Charging, running instrument) 0°C – 40°C (Charging, instrument is off) -10°C – 50°C (Non-charging) | |
| Humidity | < 95 % RH, non condensing | |
| IP Classification | IP54 | |

Service and Support

Proceq is committed to providing the best support and service available in the industry through the Proceq certified service centers worldwide. This results in a complete support for the Pundit PL-200 and Pundit PL-200PE by means of our global service and support facilities.

Warranty Information

Each instrument is backed by the standard Proceq warranty and extended warranty options.

- » Electronic portion of the instrument: 24 months
- » Mechanical portion of the instrument: 6 months

