**TECHNICAL SPECIFICATIONS**

**Piano Basic – Plus – Plus VRA**

**CLINICAL AUDIOMETER**

**DESCRIPTION**

Piano is an advanced clinical audiometer with two separate and independent channels. Piano features a complete battery of tests, all easily managed via a wide touch screen color display.

The “Plus VRA” version of the Piano audiometer forms the heart of a professional VRA system and can use as reinforces either traditional cabinet toys or videos and images on one or more displays.

**CLASSIFICATION**

EN 60645-1 / ANSI S3.6: Type 1
EN 60645-2 / ANSI S3.6: Type A or A-E
EN 60645-4 / ANSI S3.6: Compliant [Piano Plus / Plus VRA only]

**AVAILABLE SIGNALS**

Stimulus: pure tone, warble tone
2 external inputs for speech audiology
MIC input for live speech audiology
Internal input (flash memory) for speech audiology
Masking: NBN, WN

**AVAILABLE OUTPUTS AND TRANSDUCERS**

AC: TDH-39 or DD45 headphones, ER-3 / ER-5 insert earphones, HDA-200 or HDA-300 headphones [Piano Plus / Plus VRA only]
BC: B-71 bone vibrator
Free field
Insert masking earphone: IME-100

**SIGNALS SPECIFICATION**

Attenuator step: 1 and 5 dB
Presentation: Continuous, Pulsed [0.5, 1 and 2 Hz or custom freq.], Single Pulse (with selectable duration)
Warble: 5 Hz sin wave modulating signal

**AVAILABLE TESTS**

- Pure Tone audiometry
- Auto threshold [modified Hughsone-Westlake]
- Speech audiometry [2 channels]
- ABLB
- MLB
- SISI: automatic score; 1 dB increment [5 dB for familiarization]
- DLI, with increments between 0 and 5 dB
- Tone decay, with 60 or 120 sec. duration
- Stenger, with pure tone or speech stimulation
- 2 independent channels Master Hearing Aid
- TEN test
- QuickSIN® test [optional]

*Only on Piano Plus:*

- HF audiometry: from 8 to 20 kHz
- Multi Frequency: frequency steps selectable between 1/3, 1/6, 1/12 and 1/24 octave
- Bekesy Test: 125 Hz to 8 kHz fixed or sweep frequency, continuous or pulsed tone
- Masking Level Difference [MLD]: noise and / or signal out of phase

*Only on Piano Plus VRA:*

- Visual Reinforcement Audiometry (VRA) test
- Conditioned Play Audiometry [CPA] test

**PURE TONE: FREQUENCIES AND MAXIMUM LEVELS (dB HL)**

<table>
<thead>
<tr>
<th>Freq. (Hz)</th>
<th>AC TDH-39 DD45</th>
<th>AC HDA-200 HDA-300</th>
<th>AC ER-3</th>
<th>AC ER-5</th>
<th>BC</th>
<th>FF (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>125</td>
<td>80</td>
<td>85</td>
<td>90</td>
<td>90</td>
<td>-</td>
<td>75</td>
</tr>
<tr>
<td>250</td>
<td>100</td>
<td>100</td>
<td>105</td>
<td>100</td>
<td>45</td>
<td>85</td>
</tr>
<tr>
<td>500</td>
<td>120</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>65</td>
<td>95</td>
</tr>
<tr>
<td>750</td>
<td>120</td>
<td>110</td>
<td>115</td>
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<td>95</td>
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<tr>
<td>1,000</td>
<td>120</td>
<td>110</td>
<td>120</td>
<td>120</td>
<td>75</td>
<td>95</td>
</tr>
<tr>
<td>1,500</td>
<td>120</td>
<td>110</td>
<td>120</td>
<td>120</td>
<td>80</td>
<td>95</td>
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<tr>
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<td>115</td>
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<td>75</td>
<td>95</td>
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<td>100</td>
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<td>90</td>
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<td>-</td>
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<td>80</td>
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<td>50</td>
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<td>-</td>
<td>110 dB</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>20.00</td>
<td>0</td>
<td>-</td>
<td>110 dB</td>
<td>SPL</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

(*) The values refer to “normal” range; add 10 dB to each value in case of “extended range” option selected

**SPEECH AUDIOMETRY: MAXIMUM LEVELS (dB HL)**

<table>
<thead>
<tr>
<th>AC (*)</th>
<th>AC TDH-39 DD45</th>
<th>AC HDA-200 HDA-300</th>
<th>AC ER-3</th>
<th>AC ER-5</th>
<th>BC</th>
<th>FF</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>90</td>
<td>100</td>
<td>100</td>
<td>55</td>
<td>55</td>
<td>Normal: 75</td>
</tr>
</tbody>
</table>

Extended: 85

(*) Reduce by 20dB in case of free field equivalent filter activation.

**PATIENT – OPERATOR COMMUNICATION**

Talk over: built-in or external microphone
Talk back: through built-in speaker or monitor headet [included]; clip-on patient microphone included
Up to 2 patient response buttons [left and right]

**MONITOR SIGNAL**

Both channels and patient voice monitored through the built-in speaker or monitor headset [included]
TECHNICAL SPECIFICATIONS

ASSISTANT MONITOR
Available only on Piano VRA version:
The Assistant monitor headphone is used for the operator to
assistant communication.

PRINTER
Optional integrated thermal printer. Paper size: 112 mm

INTERNAL FLASH MEMORY
Used to store the speech material (.wav format)
Capacity: 2 GB (more than 3 hours of speech)
Speech material upload: through ATIT software (incl.)

CALIBRATION
Validity: 12 months.
All the parameters set through the device software

COMPUTER INTERFACE
Connection: USB [driverless]
Compatible software: - Inventis Daisy with Maestro module
- Noah with “Maestro for Noah” module

HYBRID TECHNOLOGY
Description: Piano can be controlled either as a stand-alone or as a
PC-controlled audiometer
It requires Daisy or Noah Maestro module

DISPLAY
Type: Graphical colour TFT LCD
Size: diagonal 7", 150 mm x 90 mm
Resolution: 800 x 480. Resistive touch screen

POWER SUPPLY
External medical grade power supply.
AC consumption: 100-240Vac 47-63Hz 0.9-0.34A
DC output: 6V, 4,16A cont.

MECHANICS
Without integrated printer:
Size (WxDxH): 32 x 32 x 15 cm / 12.6 x 12.6 x 5.9 in
Weight: 2 Kg / 4.4 lbs
With integrated printer:
Size (WxDxH): 32 x 39 x 15 cm / 12.6 x 15.4 x 5.9 in
Weight: 2.5 Kg / 5.5 lbs

FREIGHT PACKING
Size (WxDxH): 47 x 40 x 35 cm / 18.5 x 15.8 x 13.8 in
Gross weight (without printer): 4.4 Kg / 9.7 lbs
Gross weight (with printer): 4.9 Kg / 10.8 lbs

APPLICABLE STANDARDS
Pure tone audiometry: EN 60645-1, Type 1
Speech audiometry: EN 60645-2, Type A or A-E [depending on the
equalization filter status]
High Frequency audiometry: EN 60645-4.
Calibration: EN ISO 389-1 (TDH 39), EN ISO 389-2 (ER-3 and ER-5),
EN ISO 389-3 (B71), EN ISO 389-5 (HF), EN ISO 389-7 (FF), data from
the manufacturer (DD45 and HDA-300 headphones)
Electrical safety: EN 60601-1, Class I type BF
EMC: EN 60601-1-2

CE CERTIFICATE
93/42/EEC classification : Class Ila
Classification rule (Annex IX, 93/42/EEC): 10
Notified body: TÜV SÜD Product Service GmbH [0123]

PRODUCT CODES
10147: Piano model Basic – Clinical audiometer
10164: Piano model Basic – Clinical audiometer – with integrated
thermal printer
10148: Piano model Plus – Clinical audiometer
10165: Piano model Plus – Clinical audiometer – with integrated
thermal printer
10300: Piano model Plus VRA – Clinical audiometer with VRA exam
10306: Piano model Plus VRA - Clinical audiometer with VRA exam -
with integrated thermal printer

INCLUDED PARTS
• TDH-39 or DD45 supra-aural headphones
• HDA-200 or HDA-300 headphones (Piano Plus / Plus VRA only)
• B71 bone vibrator
• Patient response switch
• Monitor headset with boom microphone
• Clip-on microphone for patient-to-operator communication
• Plastic cover sheet
• Medical grade power supply
• USB connection cable
• User manual
• Inventis Software Suite
• Desktop response switch for children (Piano Plus VRA only)

OPTIONAL ACCESSORIES (with order code)
• 10166: ER-3A insert earphones
• 10833: ER-3C insert earphones
• 10172: ER-5A insert earphones
• 10177: IME-100 insert masking earphone
• 10181: Desktop, battery operated microphone for live speech
tests
• 10179: Amplivox Audicups noise excluding enclosures for
TDH-39 / DD45 headphones
• 10257: Additional patient response switch
• 10180: Cable set for sound booth
• 10182: Soft carrying case
• 10541: Trolley for audiometers / tympanometers
• 10293: Thermal paper for Harp and Piano audiometers (box of 5)
• 10266: One active speaker FBT J-5A
• 10533: QuickSIN® test license

Only for Piano Plus VRA:
• 10301: Visual Reinforcement for Piano VRA – Kit The Bunny
• 10302: Visual Reinforcement for Piano VRA – Peanuts the Dog
• 10303: Visual Reinforcement for Piano VRA – Jack the Donkey
• 10053: Dedicated table for Pediatric Audiometry systems
• 10307: Stand for toy and speaker
• 10308: Pre-configured mini-tower computer with 4 video outputs
- includes the webcam

Piano is developed by Inventis s.r.l.
info@inventis.it
www.inventis.it

The Inventis Quality System complies with ISO 9001 and ISO 13485
standards.