

# Diagnostic Audiometer **AD229<sub>e</sub>**



# AD229<sub>e</sub>

## Features:

- 125Hz - 8.000Hz
- 2 independent oscillators
- -10dB to 120dBHL Output
- Air, Bone and Speech
- Automatic Speech Scoring
- WN, NB and SN Masking
- Free Field Speech and Pure Tone
- 5dB and 1dB Attenuators
- Standard TDH39 Headset
- Insert Phones (Optional)
- Pure, Warble and Pulsed Tones
- Automatic Threshold Test
- 2 Channel Binaural Speech
- SISI and Békésy tests
- OSHA automated test procedure (US edition only)
- Stenger and ABLB Tests
- Tone in Noise Test (Langenbeck)
- 2 Channel Master Hearing Aid
- Talk Forward, Talk Back
- Built-in Monitor Speaker
- Built-in Buzzer
- DSP Technology
- RS232 Connection for PC
- PC On-line Monitoring Available
- NOAH Compatible
- Laser Printer Connection
- Ink Jet Printer Connection (Optional)
- Various Printing Options
- Carrying Case (Optional)
- Medically CE-approved
- True RMS VU-Meter

## Portability

An optional robust carrying case, as shown below, will hold the AD229e with all its accessories.



## Applications

The high quality of the AD229e makes it well suited for any stationary or portable application where diagnostic testing of air, bone and speech is performed. The time saving automatic test functions combined with the RS232 computer interface makes the AD229e ideal for modern healthcare environments. The Talk Forward and Talk Back functions make it easy to work with the AD229e, especially with sound cabin installations. When connected to an MT10/MTP10 Impedance system a complete diagnostic test set-up is available, including a thermal printer. Full NOAH compatibility completes the picture.



## Earphones and Noise Excluders



**Amplivox**  
Features independent suspension of the TDH39 earphones.



**Peltor**  
Traditional noise excluding headset.



**Insert Phones**  
EAR-Tone 3A insert phones feature very low cross hearing and reduce need for masking. Ambient noise is also attenuated.

## Auto Threshold and Békésy

The AD229e incorporates a facility for performing threshold determination automatically. The test procedure is based on the Hughson-Westlake method (up 5dB, down 10dB) and conforms to ISO 8253. Desired test frequencies may be selected freely by the user.

An automatic threshold procedure featuring the quick OSHA 1kHz test/retest validity function is available in the US edition.

The Békésy Test, featuring pure tone, pulsed tone or narrow band noise as stimuli as well as masking with narrow band noise, is incorporated. After testing the test results can be recalled from the memory of the AD229e or transferred to a PC for database storage or printing. A buzzer is built in, allowing the operator to be informed about test status when doing automatic tests.

## Master Hearing Aid

The AD229e has incorporated a 2 channel Master Hearing Aid for hearing aid simulation.

The speech signal from the live voice microphone is transformed directly into digital signals, and all sound shaping filters thus work in the digital domain ensuring high sound quality.

Filters and Acoustic Gain can be selected individually for each channel.

## ABLB / SISI / Stenger/ Tone in Noise

As well as the pre-programmed ABLB and SISI tests the AD229e can perform the Stenger Test with pure tones for evaluating malingering, or as a binaural speech test with a monophonic speech signal. The Langenbeck "Tone in Noise" test is also included.

## Printing

Laser Printer or Inkjet Printer (optional) can be connected directly to the AD229e for large high quality printouts. Alternatively printouts can be obtained from a PC. The MTP10 printer for the handheld diagnostic impedance audiometer MT10 can also act as printer for AD229e.

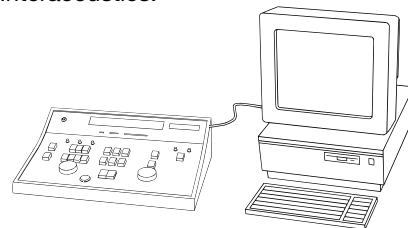
## Medical CE-mark

The Medical CE-mark - recognizable by its 4 digit number - indicates that, in addition to having passed strict tests for electro-magnetic radiation and susceptibility, the AD229e is manufactured in accordance with an officially approved Quality Control System.



## Computer Connection

The use of a PC for printing, database storage and on-line monitoring is possible using NOAH or the Windows® based PrintView or laBase95 software from Interacoustics.



## Windows Based Software

- PrintView features on-line monitoring and printing and is very easy to use.
- laBase95 is similar to PrintView but includes a database for general patient data and hearing aid information.
- Various NOAH interface software packages are also available.



The AD229e is ideally suited for hearing aid fitting applications and is compatible with NOAH.



## Speech Testing and Communication

Live Voice speech testing is easy to perform using the built-in goose neck microphone.

The optional MTH400M monitor headset with boom microphone may substitute the goose neck microphone.

**CD or Tape** players may be connected through the two channel input.

**Talk Back** is provided for sound field installations.

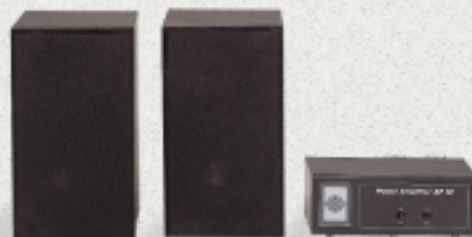
**Talk Forward** is available using the built-in microphone. The intensity is easily adjusted on the front panel.



**Monitoring** is possible either through the operator's headset or through the built-in monitor loudspeaker.

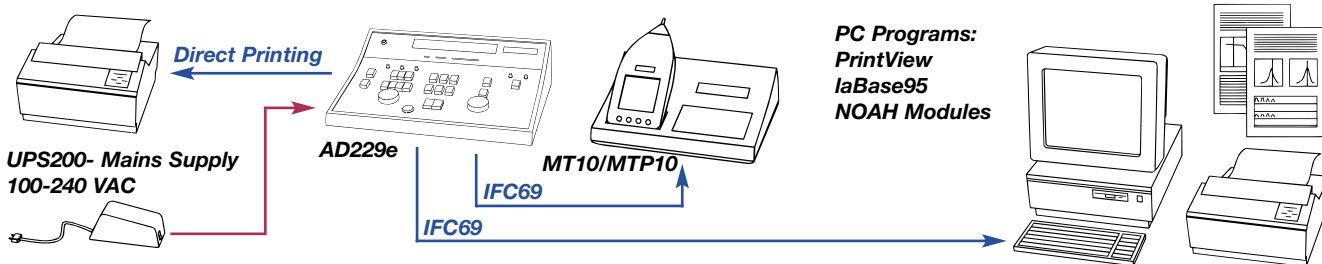
## Sound Field Installation

Speech and pure tone may be presented under free field conditions. Available systems range from 90dB SPL to 115dB SPL, all medically approved. A set of connection panels, AFC8, is available for connection to a sound booth.



A 90dB SPL free field system consists of the AP12 amplifier and a pair of ALS2 speakers.

## AD229e Interconnections



## Specifications

**Safety Standard:** EN 60601-1

**Audiometer Standard:** Tone: EN 60645-1/ANSI S3.6, Type 2.

Speech: EN 60645-2/ANSI S3.6 type B or B-E.



**Medical CE-mark:** The CE-mark indicates that Interacoustics A/S meets the requirements of Annex VI of the Medical Device Directive 93/42/EEC. Approval is made by TÜV - identification no. 0123.

### Calibration:

**AC:** ISO 389-1 (TDH39).

ISO 389-2 (EAR-Tone 3A).

**BC:** ISO 389-3.

### Frequencies and Maximum Hearing Levels:

	AC dBHL	AC dBHL	BC dBHL	NB/SN	FF
Hz	TDH39	EAR-Tone3A	B71	dB HL	dB SPL
125	90	90		80	90 dB to 115dB SPL depending on FF system
250	110	105	45	100	
500	120	110	65	110	
750	120	115	70	110	
1000	120	120	70	110	
1500	120	120	70	110	
2000	120	120	75	110	
3000	120	120	80	110	
4000	120	115	80	110	
6000	120	100	55	110	
8000	110	95	50	90	

**Extended Range Function:** If not selected, the AC output will be limited to 20dB below maximum output.

**Input:** Tone, Warble Tone  $\pm 5\%$ , 5Hz (true sine wave frequency modulation).

**Masking stimulus:** Automatic selection of Narrow Band Noise (or White Noise) for tone presentation and Speech Noise for speech presentation.

**Outputs:** Left, Right, Bone L+R, Insert Phones, Insert Masking, FF1, FF2.

**Number of oscillators:** 2

### Transducers:

TDH39 Audiometric Headset.  
EAR-Tone 3A Insert Phones (optional).  
HDA200 Audiometric Headset (optional).  
B71 Bone Conductor.

**Communication:** Talk Forward: 0-110 dB SPL continuously adjustable on operation panel.  
Talk Back: Microphone input and level adjustment on operation panel.  
Monitor: Output of Tape or CD through built-in speaker or through external earphone or speaker.

**Tone Presentation:** Manual or Reverse.  
Single pulse.  
Multiple pulses 250-5000 msec. on/off.

**Auto Threshold:** Patient controlled Hughson Westlake procedure according to ISO 8253-1 or OSHA procedure with automatic re-check (US edition only).

**Frequency Selection:** 125Hz, 250Hz, 750Hz, 1500Hz or 8kHz may freely be deselected if a quicker test routine is desired.

**Synchronous Masking:** Locks channel 2 attenuator to channel 1 attenuator.

**Store Function:** Internal memory for AC L/R and BC L/R and full speech curve.

### Tests:

**SISI** with auto score calculation. (5dB included for familiarisation).

### ABLB.

**Stenger** (Binaural pure tone stimulation).

**Stenger Speech** (Binaural speech test with monophonic signal).

**Langenbeck** (Tone in Noise).

### Békésy Test:

Pure Tone or Narrow Band stimulation.  
Fixed Frequency. Continuous or Pulsed tone.  
2 channel speech: Input for 2 channel prerecorded material.

### 2 channel Master Hearing Aid:

Both channels operate independently with Gain and Filter Settings.

**Display:** Alfa-Numerical Display.

**Patient Signal:** Reed switch push button.

### Interface and printing:

Bi-directional RS232C.  
Output for MTP10 Printer.  
Output for Laser printer with HP GL/2 language.  
Output for Ink Jet or Matrix printer (optional).

### Examples of Compatible Windows Software:

laBase95 database program.  
PrintView for on-line PC monitoring and printing.  
NOAH hearing aid fitting software.  
CONNEX hearing aid fitting software  
PAX hearing aid fitting software.

**Construction:** Plastic cabinet.

### Attenuator Controls:

Rotary switches (Push buttons optional).

**Power Supply:** External UPS200 (included).  
100 - 240 V.

**Consumption:** 40 VA.

**Dimensions:** (W x D x H) 345 x 255 x 100 mm/  
14 x 10 x 4 inches.

**Weight:** 1.8 kg/4.0 lbs. (external power supply  
UPS200 + 0.6 kg/1.3 lbs.)

### Air Freight Packing:

1 case: 48x31x37 cm/19x12.2x14.6 inches.  
Gross weight: 5.6 kg/12.4 lbs.

## Ordering Information

### Included Parts:

TDH39 Audiometric Headset  
B71 Bone Conductor  
APS2 Patient Response Button  
UPS200 External Power Supply  
200 AF12 Audiogram Charts  
3 Pens  
Operation Manual  
Multilingual Instruction for use  
Service Manual

### Optional Parts:

21925 Amplivox Audiocups, noise reducing headset  
50250 Peltor noise reducing headset (may be supplied at no extra cost)  
ACC29 Carrying Case  
EAR-Tone 3A Audiometric Insert Phones  
HDA200 Audiometric Headset  
CIR22 Insert Earphone Set for Masking or Monitoring

IPA26 printer adaptor for Inkjet printer  
IFC59 (25 pins) computer cable  
IFC69 (9 pins) computer cable  
EM400 Talk Back Microphone  
MTH400 Monitor Headset  
MTH400M Monitor Headset w. boom  
Microphone  
Push buttons instead of rotary switches

### Manufactured by:

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