

## Clinical Audiometer AC33

- Efficient Hearing Examinations



# Audiometry *precision*

The AC33 is a two channel clinical audiometer designed for use in clinics, hospitals and by hearing aid fitters who require two channel testing capability. Carefully designed operation procedures ensure fast and reliable performance of all standard clinical audiometric tests. The easy to read display, together with the functional layout of the front panel, makes normal manual testing easy and comfortable. In addition pre-programmed tests, some with automatic scoring, are incorporated for threshold testing, speech testing and SISI tests. In a modern clinical environment it is important to provide interconnection with computers. The AC33 is therefore equipped with computer interface to accommodate this and a range of support software is available. The AC33 is also fully compatible with NOAH.



leading diagnostic solutions



# Clinical Audiometer AC33

- Efficient diagnostic examinations

## Two Independent Channels

The AC33 is a two channel clinical audiometer which provides a wide range of input and output parameters, thus ensuring optimum test stimulus and transducer combinations.

## Insert Phones

In addition to the traditional TDH39 headphones, an optional integrated free field system and EAR-Tone 5A insert phones may be individually calibrated and used for pure tone or speech presentation. Insert phones provide very low cross hearing and reduce the need for masking. Ambient noise is also attenuated.

## Auto Threshold

The AC33 incorporates a facility for performing threshold determination automatically. The test is based on the Hughson-Westlake method (up 5dB down 10dB) and conforms to ISO 8253-1.

## Tests

The AC33 provides a high degree of flexibility in routing stimuli to outputs, allowing the clinician to perform a diverse range of tests. These may include ABLB, Stenger using tone or speech, binaural speech, tone in noise, and SISI with automatic scoring.

## Masking

The AC33 automatically pre-selects the appropriate noise when masking is activated in a particular test.

A "Synchronise" function provides automatic tracking between the stimulus and masking levels. Ipsilateral as well as contralateral masking is available for both tone and speech testing.



*EAR-Tone 5A Insert Phones*



## Data Storage with Windows® Based Software

Transferring data to a PC is possible by two different applications. The Interacoustics database OtoAccess™ enables data collection from multiple instrument sources into one patient file. Hearing aid information may also be included. NOAH hearing aid fitting software will also integrate the test data when used with the Interacoustics NOAH audiometer module software.

## Sound Field Installation

Speech, tone, or noise may be presented under free field conditions. Presentation levels range from 90 to 115dB SPL. A set of connection panels, AFC10, is available for connection to a sound booth.



## Speech Testing and Communication

- Live voice. A built in goose neck microphone is provided. Alternatively, an optional external microphone may be used - e.g. the boom microphone of the MTH400M monitor headset. True RMS VU-meters make it easy to adjust the intensity.
- CD / Tape. Inputs for pre-recorded speech material are available.
- Talk back with front panel intensity adjustment is provided.
- Full monitoring is available via the built in loudspeaker, headphone or active external loudspeaker.
- The built-in speech score counter is easily operated using incorrect/correct scoring buttons. The % score is calculated and displayed automatically. If desired, an entire speech audiogram can be recorded and printed out. On-line monitoring is also possible when connected to a PC.

## Earphones and Noise Excluders

- The optional Amplivox Audiocups features independent suspension of the TDH39 earphones.
- The optional monitor headphone MTH400M includes a boom microphone for live voice testing. Also available without boom microphone.
- EAR-Tone 5A insert phones feature very low cross hearing and reduce need for masking. Ambient noise is also attenuated.



*TDH39 headset*



*Amplivox Audiocups for TDH39*

# General Technical Specifications

## Standards:

Audiometer: EN 60645 -1, EN60645-2,

ANSI S3.6, Type 2

Speech: EN60645-2/ANSI S3.6 type A or A-E.

Safety: EN 60601-1, Class I, Type B.

**Calibration:** AC: ISO 389-1 (TDH39), ISO 389-2 (EAR-Tone5A), BC: ISO 389-3, ISO 389-4, NB: ISO 389-4.

## Medical CE-mark:

Interacoustics A/S meets the requirements of the Annex II of the Medical Device Directive 93/42/EEC. Approval of the quality system is made by TÜV – identification no. 0123.

**Channels:** Two independent channels.

## Frequencies and Maximum Hearing Levels:

Hz	AC dBHL TDH 39	AC EAR- Tone 5A	BC B71	NB	FF int.	FF ext.	BB/ SN
125	90	95		70	65	70	100
250	110	100	45	90	75	90	100
500	120	110	60	100	90	100	100
750	120	120	70	100	90	100	100
1000	120	120	70	100	90	100	100
1500	120	120	70	100	90	100	100
2000	120	120	70	100	90	100	100
3000	120	120	80	100	90	100	100
4000	120	120	80	100	90	100	100
6000	120	105	50	100	90	100	100
8000	100	100	50	80	80	80	100

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

**Channel 1:** Input: Tone, Microphone, Tape/CD 1+2. Output: Left, Right, Bone L+R, Free Field 1+2, Insert phones.

**Channel 2:** Input: Tone, Microphone, Tape/CD, 1+2, NB, SN, BB. Output: Left, Right, Bone, Free Field 1+2, Insert phones, Insert masking, Off.

**Presentations Ch 1:** Manual or reverse. Single or multiple pulses. Single/multiple pulse speed: 150, 200, 250, 500, 750, 1000, 1500, 2000, 4000, 5000 ms.

**Presentations Ch 2:** Manual or reverse.

Simultaneous or alternate to Ch 1.

**Modulation:** Warble:  $\pm 5\%$  5Hz. True sine wave.

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

**Attenuators:** Totally click free, -10 to 120 dB HL in 1 or 5 dB Steps.

**Tone Switches:** Silent touch switches.

**VU Meter:** Two independent VU Meters monitor speech for Ch 1 and Ch 2.

## Transducers:

TDH39 Audiometric Headset.

EAR-Tone 5A Insert Phones (optional).

B71 Bone Conductor.

CIR22 Insert Earphone for masking.

## Calibration Possibilities:

	Tone*	SP	NB	SN
Phone L / R	x	x	x	x
Insert L / R	x	x	x	x
Bone	x	x	x	x
Insert masking	x	x	x	x
FF1	x	x	x	x
FF2	x	x	x	x

\*Warble tone can be selected freely.

## Communication:

**Talk forward:** 0-110 dB SPL: Continuously adjustable on front panel, built-in goose neck microphone.

**Talk Back:** Microphone input. Level adjusted on front panel.

**Monitor:** Built in speaker headphone or active loudspeaker. Monitor output level adjusted on front panel.

**Colour Printouts:** Via computer.

**Interface:** Built-in two way computer interface which allows the computer to both monitor and control the AC33. Control actions will be indicated on operation panel and display.

Using a PC as an on-line monitor is possible.

## Examples of Compatible Windows® Software:

Interacoustics database and diagnostic modules

PrintView for on-line PC monitoring and printing.

NOAH hearing aid fitting software.

## Test Types:

**Tone:** Manual, continuous, single pulse, pulsing (variable).

**Speech:** Live voice or two tape (or CD). Built-in goose neck microphone. Boom microphone of monitor headset (optional).

Score counter which calculates in % the number of correct responses.

**Auto Threshold:** Patient controlled Hughson-Westlake Test after ISO 8253-1. 3 out of 5 or 2 out of 3 selectable response criteria. Reduced frequency range option for rapid testing.

**ABL:** Individually adjustable pulse speed and pulse length.

**SISI:** 0, 1, 5 dB, 20 increments. Automatic score counter which calculates in % the number of responses to 1 dB increments.

**Stenger:** Pure tone or Speech can be used for Stenger test.

## Free Field:

**System FFAC33:** Built in 2x12W amplifier APD-AC33 and two ALS7 speakers. 95dB SPL. (Optional)

**System FF ext:** External 2x70W amplifier, AP70, and two ALS7 speakers. 105dB SPL. (Optional)

**Power:** AC 50-60 Hz. 100-120 V, 200-240 V.

**Consumption:** Max. 140 VA.

**Construction:** Painted metal cabinet.

**Dimensions (LxWxH):** 48x40x15 cm /

19x16x6 inches.

**Weight:** 9 kg / 20lbs.

**Air Freight Packing (LxWxH):** 75x55x25 cm /

30x22x10 inches.

**Gross Weight:** 12.8 kg / 28 lbs.

## Included Parts:

TDH39 Audiometric headset

B71 Bone conductor

Goose-neck electret microphone

APS2 Patient response button

Power cable 110 or 220 V (please specify)

Dust cover

200 AF12 Audiogram charts

Pen set

Operation manual CD

Multilingual CE instructions for use

## Options:

APD-AC33 Built-in 2x12 watt power amplifier for FF

## Optional Parts:

AP70 2x70 watt external power amplifier

ALS7 FF loudspeaker ( AP70 )

ALS15 FF loudspeaker ( AP70 )

EM400 Electret microphone for talk back

21925 Audiocup enclosures

50250 Peltor noise reducing headset

CIR22 Insert earphone for masking and monitoring

EAR-Tone 5A Insert phones

MTH400 Monitor headset

MTH400M Monitor headset with boom mic.

IFC5/IFC39 RS232C Computer connection cables

OtoAccess™ Database and diagnostic modules software

PrintView software

IA-NOAH-Aud software

IA-NOAH Driver software

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