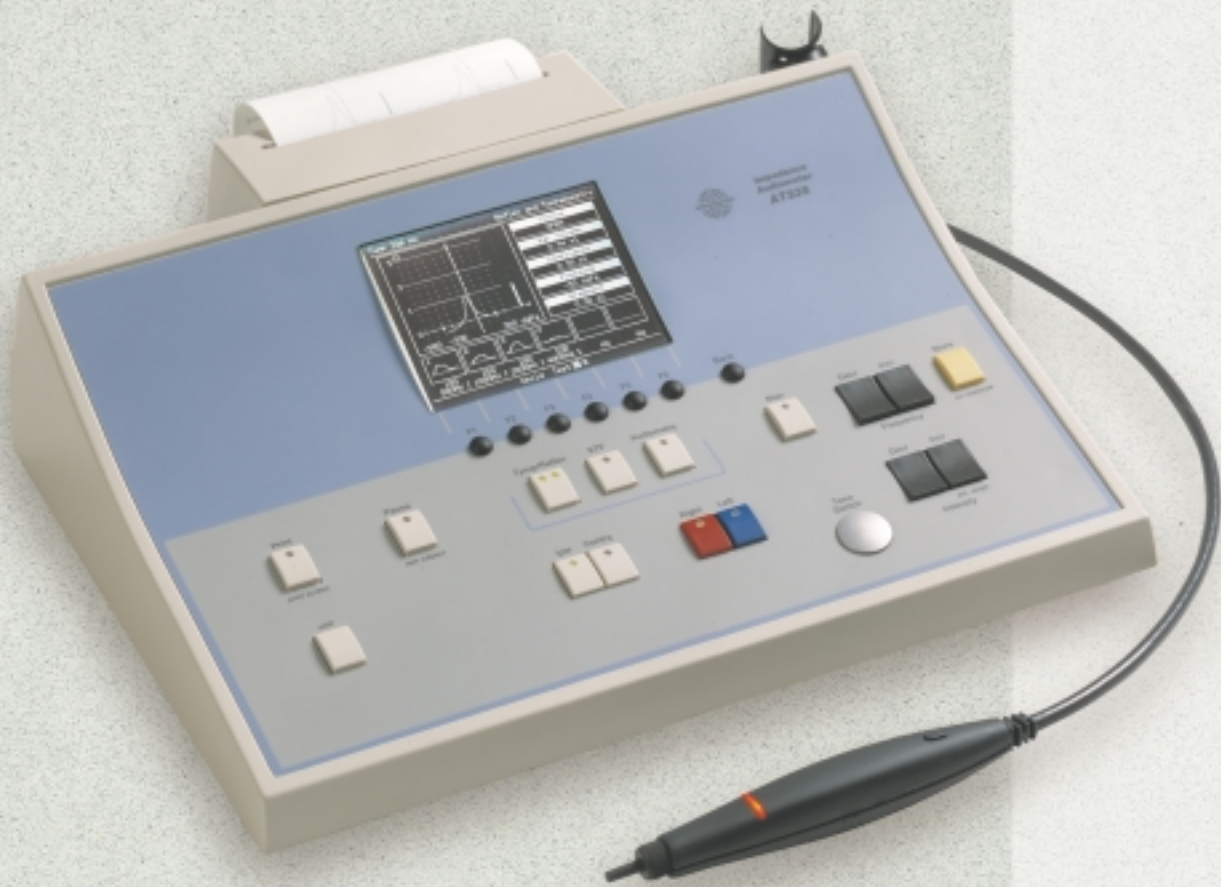


Impedance Audiometer **AT235**



AT235

Applications

The AT235 is an automatic impedance audiometer well suited for clinics doing screening, as well as diagnostic work. Ease of operation has been the primary design criteria, but not at the expense of testing flexibility.

The test battery includes tympanometry, acoustic reflex testing, ipsilateral and contralateral reflex decay testing, eustachian tube function test and AC audiometry.

Tympanometry is very fast, and for the subsequent reflex test there is a choice of two different automated test protocols. Manual reflex testing is available also for those who need to do more in depth analyses, or if part of the automatically obtained results needs modification.

The choice between either a traditional screening probe system or a clinical probe system allows the instrument to be well matched to the patient population.

Probe Systems

The handheld pencil type probe system supplied as standard is very lightweight, and is particularly well suited for screening applications. A clinical probe system is available as an option. This probe with the lightweight detached probe tip will ensure optimum reliability for tests such as reflex decay. This clinical probe may also be used for handheld application with the main probe strapped to the wrist. Both probes indicate status of test, as well as choice of Left and Right.

Tympanometry

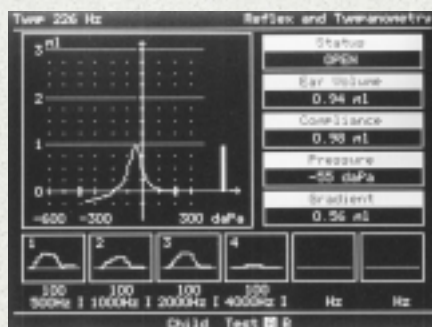
Interacoustics' endless airflow technique used in the AT235 is the perfect way to ensure proper function in difficult test situations, for example with crying or fidgeting children. In such situations, an intermittent seal in the initial test phase will never result in time consuming resetting periods. Another unique feature is the intelligently controlled pump system, which incorporates an adaptive speed control. This combines a very fast test speed with high resolution of the tympanogram peak that traditionally is only available by using slower pump speeds.



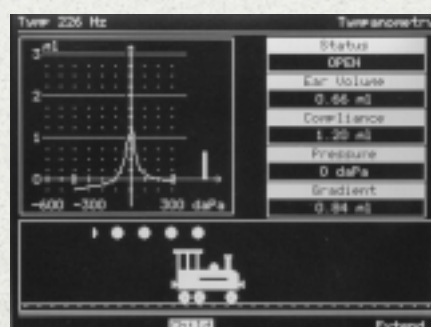
Optional Clinical Probe System

Children's Train

A train may be displayed on the screen, to get the attention of the child. Test results can be monitored simultaneously with displaying the train.



Tympanogram and reflex test results displayed simultaneously.



A moving train may help to keep children quiet during testing.

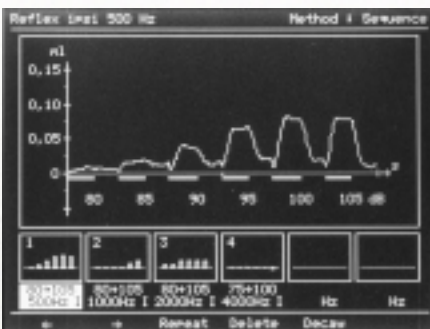
Two Automatic Reflex Tests

Reflex testing is very easy, but allows also those in need of versatility to control all details of the test. Two separate test protocols may be programmed and either may be selected by the push of a button. All parameters are easily programmable by the end user if the supplied tests are not optimum suited for test routines of the clinic. In addition to testing with a set of fixed intensities, available automated functions include automatic intensity search and automatic test for reflex growth.

The AT235 does not restrict mixing of ipsi and contra stimuli and also features noise for stimulation.

There are few limitations on storing and printing of reflex results, as more than 40 reflexes may be stored per ear.

Reflex test with full manual stimulus control is also available, and this manual function also allows repeating or changing test result obtained by one of the automatic test protocols.



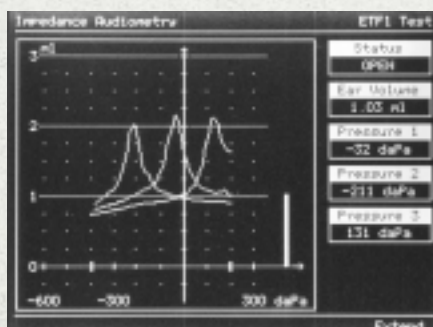
A group of increasing stimuli for reflex testing, clearly displays reflex growth.

Decay - Contra and Ipsi

Acoustic reflex decay test is available with ipsilateral stimulation as well as with contralateral stimulation.

ETF Test

Test of the eustachian tube for ears with normal eardrums is available.



Automated Eustachian Tube test is available.

Audiometry

Audiometry is available through an independent headset with two phones (optional).

The test may be run manually or automatically, and for patient comfort, the maximum output may be reduced if needed.

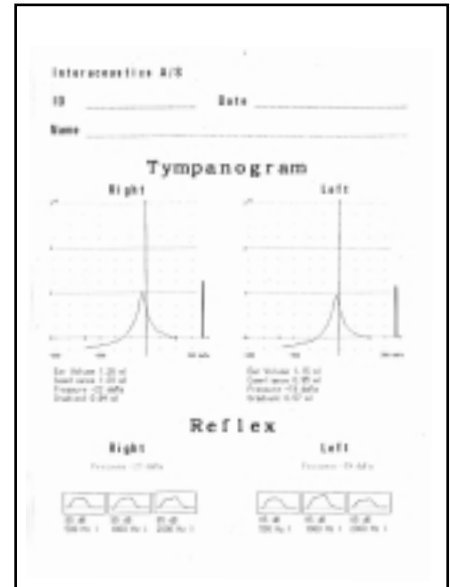
Windows Based Software

All data obtained may be transferred to one of the following Windows based software programs:

PrintView enables monitoring of the AT235 and the printing of test results. In developing this software maximum attention has been given to providing a program which is easy to use.

laBase95 is similar to PrintView but incorporates a database for general patient data and hearing aid information.

NOAH hearing aid fitting software may also be used for storing data from the AT235.



Printout using condensed printout mode.

Printing Options

The built-in fast thermal printer allows printout of all test results. Alternatively an ink-jet or laser printer may be connected directly to AT235 for printout of test results. If used with one of Interacoustics' Windows based programs or NOAH, printouts are also available through the PC.

Printer share between AT235 and other Interacoustics audiometers is available with the built in thermal printer.

The AT235 is also available without thermal printer as model AT235-xp.

This will provide an unusually cost effective way of meeting the need for impedance testing.

Portability

A convenient lightweight carrying case (optional) will hold the AT235 and all its accessories.



Various included and optional parts.



An optional dedicated carrying case is available.

AT235 Specifications

Standards:

Safety: EN 60601-1, Class I, Type B
EMC: EN 60601-1-2
Impedance: EN 61027/ANSI S3.39 Type 1
Audiometer: EN 60645-1/ANSI S.3.39 Type 4 Tone



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.

Tympanometry:

Probe tone:

Frequency: 226Hz
Level: 85 db SPL
Gain Control: AGC

Air pressure:

Control: Automatic
Range: Default +200 to -400daPa (max. +300 to -600daPa)
Safety limitation: -800 daPa and +600 daPa
Pressure change rate: Selectable in the set-up between 50, 150 and >250 daPa/s or automatic
Compliance: Range: 0.1 to 6.0 ml (numerical: 0.1 to 8.0 ml)

Function:

Automatic, where pump speed, start- and stop pressure can be user-programmed in the set-up.

Eustachian Tube Function

Williams test, for normal ear drums.

Acoustic Reflex Functions:

Test Types:

Automatic Reflex:

Two independent user selectable protocols. Series of fixed intensities available. Automated intensity search functions available for threshold search and reflex growth indication. Free mixing of Ipsi and Contra.

Manual Reflex:

Manual control of all stimuli. May also be used to redo part of automated test results.

Reflex Decay:

Manual control, with stimulus duration of 10 sec. Ipsi or Contralateral Stimulation.

Maximum Intensities:

Freq. Hz	Ipsi	Contra TDH39	Contra CIR22	Audiometry	
				AC dBHL TDH39	AC dBHL EARTone 3A
125				90	90
250	-	110	90	110	105
500	105	120	100	120	110
750				120	115
1000	110	120	110	120	120
1500				120	120
2000	105	120	110	120	120
3000	100	120	110	120	120
4000	100	120	110	120	115
6000	-	120	-	120	100
8000	-	110	-	110	95
WN	105	120	110	-	-
LPN	105	120	110	-	-
HPN	105	120	110	-	-

For safety / comfort reasons an optional limitation of maximum intensity is available.

Contra Earphone:

THD39 or insert receiver CIR22 (optional)

Attenuator:

1dB or 5dB steps.

Memory:

Internal memory for two ears. Each ear: 6 Ipsi and 6 Contra recordings. Each may have up to 6 stimuli. Also, there is memory for additional manual reflex recordings. (Total max. 78 reflexes per ear).

Audiometer Functions:

Patient Response:

Connection for patient response switch.

Outputs:

Contra TDH39 headset may be used for audiometry.
Double TDH39 Headset for audiometry (optional)

Test types:

Manual Audiometry.
Automatic Audiometry according to ISO 8253-1 (Patient controlled Hughson-Westlake).

Various:

RS232:

Input/output for computer communication. One mode allows an external PC to both monitor and control the instrument. The control actions can be followed on the display and operation panel. Online communication, where the measurement data are sent to an external PC, can be selected.

Keyboard:

Connection for external keyboard, standard PC type.

Printer:

Built in fast thermal printer with paper width: 112 mm
Connection for external laser or ink-jet printer:
Language: HP PCL L3 for HP DeskJet and IBM mode for Cannon Bubble jet.

Accuracy:

Stimulation Frequencies: $\pm 1\%$
Probe tone frequency: ± 1 Hz
Probe tone level: 85 dB SPL ± 1.5 dB measured in an IEC126 acoustic coupler. AGC for ear canal compensation.
Pressure measurement: $\pm 5\%$ or 10 daPa, whichever is greater
Compliance measurement: $\pm 5\%$ or 0.1 ml, whichever is greater

Examples of Compatible Windows Software:

laBase95 Database Program.
PrintView for PC monitoring and printing
IA-NOAH-Imp Module for interfacing to NOAH

Construction:

Plastic cabinet

Power supply:

UPS400 (Included) 100-240V

Warm up time:

10 minutes at room temperature (20° C).

Consumption:

15VA, max. 45VA

Dimensions:

LxWxH 36x26x10 cm / 14x10x4 inches
Weight: 2.8 kg / 6 lbs.

Air Freight Packing:

48x31x37 cm / 19x22.2x14.6 inches.
Gross weight: 6.5 kg / 12.4 lbs.

Ordering Information

Probe option:

AT235h-ATP Clinical Probe system

Printer option:

AT235-xp is identical to the AT235 but has no built-in printer. Suitable for installations where computer connection takes care of printing, or where external printer is connected.

Included Parts:

AT235-ATP Standard Probe System
TDH39 Single Contralateral Earphone
UPS400 External Switch Mode Power Supply
Power Cable (110/220V, please specify)
BET50 Box of 65 assorted Eartips
TPR35 3 Rolls of Recording Paper
PCR-AT235 Dust Cover
Operation/Service/Multilingual CE manuals

Optional Accessories

TDH39 Audiometric Headset
EAR-Tone3A Insert Phones for Audiometry
ACC35 Carrying Case
CIR22 Contralateral Insert Phone
APS2 Patient Signal
CAT-222 Calibration Unit 0.2 and 5 ml
CAT-227 Calibration Unit 0.2-0.5-1-2-3-4-5 ml
IES-2 Impedance Ear Simulator

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