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## Technical Specifications

# AC40 Clinical Audiometer

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## License Overview

International configuration AC40		
	Basic license	Extended license
<b>Licenses Audiometry</b>		
Basic Audiometry	x	x
Békésy	x	x
SISI	x	x
Langenbeck	x	x
Stenger	x	x
Modified Hughson-Westlake	x	x
ABLB	x	x
Speech testing with CD/Mic	x	x
Build-in wave files	x	x
Binaural Speech	x	x
Hearing Loss Simulator (HLS)	x	x
Pediatric Noise		x
MLD		x
Multi Frequency (MF)		x
Freefield Power (4 x 20W)	x	x
Sync mode - Audiogram transfer	optional	optional
MHA	x	x
QuickSIN	optional	optional
TEN test	optional	x
High Frequency (HF)	x	x
Freefield Lineout	x	x
Hybrid mode - PC controlled mode	optional	optional
Sync mode - Audiogram transfer	optional	optional
<b>Functions available only in Diagnostics suite</b>		
Weber	x	x
MaskingHelper	x	x

## Languages supported in IMP and AUD

	Chinese	Czech	English	Finnish	French	German	Greek	Italian	Japanese	Korean	Norwegian	Polish	Portuguese	Russian	Spanish	Turkish
<b>IMP</b>																
MT10			X		X	X										
Existing AT235			X			X										
New AT235	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Existing AA222			X			X										
New AA222	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Titan	X	X	X		X	X		X	X	X			X	X	X	
<b>AUD</b>																
AS608			X		X	X									X	
AD226	X		X		X	X		X				X	X	X	X	X
AD629 / AD229	X *	X *	X	X *	X	X	X *	X	X *	X *	X *	X	X *	X *	X	X
AC40	X *	X *	X	X *	X	X	X *	X	X *	X *	X *	X	X *	X *	X	X
<b>Suites</b>																
Titan suite	X	X	X		X	X		X	X			X	X	X	X	X
DS	X	X	X		X	X	X	X	X	X		X	X	X	X	X

## Included and Optional Parts

### Included Parts

AC40
Goose neck 1059 microphone
DD45 Audiometric headset
B81 bone conductor headset
2 x APS3 Patient response switch
HDA300 Phone headset for HF
Cleaning cloth
Power cable
Instructions for Use AC40
Monitor Headset with boom

### Optional Parts

TDH39AA with Amplivox Headset
DD45 with Peltor Headset
B71 bone conductor headset
Eartone 5A 10 Ohm
Eartone 3A 10 Ohm
IP30 insert phone 10 Ohm
CIR33 insert earphone kit for masking or monitoring
Amplivox audiocups, noise reducing headset
Talk back microphone
Sound field speakers SP90 (with external power amp)
AP12 Power Amplifier 2x12 Watt
AP70 Power Amplifier 2x70 Watt
Cable USB 2m
Diagnostic Suite
OtoAccess™ database

# General Technical Specifications

## AC40 Technical Specification

<b>Safety Standards</b>	IEC60601-1:2005; ES60601-1:2005/A2:2010; CAN/CSA-C22.2 No. 60601-1:2008; IEC60601-1:1988+A1+A2 Class I Type B Applied parts IPx0	
<b>EMC Standard</b>	IEC 60601-1-2:2007	
<b>Audiometer Standards</b>	Tone: IEC 60645-1:2012/ANSI S3.6:2010 Type 1- Speech: IEC 60645-2:1993/ANSI S3.6:2010 Type A or A-E	
<b>Calibration</b>	Calibration information and instructions is located in the AC40 Service manual	
<b>Air Conduction</b>	TDH39: DD45: HDA300: HDA280 E.A.R Tone 3A/5A: CIR 33 IP30	ISO 389-1 1998, ANSI S3.6-2010 PTB/DTU report 2009 PTB report PTB 1.61 – 4064893/13 PTB report 2004 ISO 389-2 1994, ANSI S3.6-2010 ISO 389-2 1994 ISO 389-2 1994, ANSI S3.6-2010 DES-2361
<b>Bone Conduction</b>	B71: B81 Placement:	ISO 389-3 1994, ANSI S3.6-2010 ISO 389-3 1994, ANSI S3.6-2010 Mastoid
<b>Free Field</b>	ISO 389-7 2005, ANSI S3.6-2010	
<b>High Frequency</b>	ISO 389-5 2006, ANSI S3.6-2010	
<b>Effective masking</b>	ISO 389-4 1994, ANSI S3.6-2010	
<b>Transducers</b>	TDH39 DD45 HDA300 HDA280 B71 Bone B81 Bone E.A.R Tone 3A/5A: CIR 33 IP30	Headband Static Force 4.5N $\pm$ 0.5N Headband Static Force 4.5N $\pm$ 0.5N Headband Static Force 8.8N $\pm$ 0.5N Headband Static Force 5N $\pm$ 0.5N Headband Static Force 5.4N $\pm$ 0.5N Headband Static Forces 5.4N $\pm$ 0.5N
<b>Patient Response switch</b>	Two push button.	
<b>Patient communication</b>	Talk Forward (TF) and Talk Back (TB).	
<b>Monitor</b>	Real stereo output through built-in speakers or through external earphone or assistant monitor.	
<b>Special tests/test battery (some are optional)</b>	<ul style="list-style-type: none"> <li>• Stenger</li> <li>• ABLB</li> <li>• Langenbeck (tone in noise).</li> <li>• Masking Level Difference</li> <li>• Pediatric Noise Stimuli</li> <li>• Multi Frequency</li> <li>• High Frequency</li> <li>• Speech from Hard-drive (Wave Files)</li> <li>• SISI</li> <li>• Master Hearing Aid</li> <li>• Hearing Loss Simulator</li> <li>• QuickSIN(tm)</li> <li>• Auto threshold: <ul style="list-style-type: none"> <li>○ Hughson Westlake</li> <li>○ Békésy</li> </ul> </li> </ul>	
<b>Stimuli</b>		
<b>Tone</b>	125-20000Hz separated in two ranges 125-8000Hz and 8000-20000Hz. Resolution 1/2-1/24 octave.	
<b>Warble Tone</b>	1-10 Hz sine +/- 5% modulation	
<b>Pediatric Noise</b>	A special narrowband noise stimulus. The bandwidth is frequency depended 125-250 Hz 29%, 500Hz 24%, 750 Hz 20%, 1kHz 17%, 1.5kHz 13%, 2kHz 11%, 3kHz 9% from 4kHz and up is fix 8%,	
<b>Wave file</b>	44100Hz sampling, 16 bits, 2 channels	

<b>Masking</b>	Automatic selection of narrow band noise (or white noise) for tone presentation and speech noise for speech presentation. Narrow band noise: IEC 60645-1 2012, 5/12 Octave filter with the same centre frequency resolution as pure Tone. White noise: 80-20000Hz measured with constant bandwidth Speech Noise. IEC 60645-2:1993 125-6000Hz falling 12dB/octave above 1KHz +/-5dB					
<b>Presentation</b>	Manual or Reverse. Single or multiple pulses.					
<b>Intensity</b>	Check the accompanying Appendix Available Intensity Steps is 1, 2 or 5dB Extended range function: If not activated, the Air Conduction output will be limited to 20 dB below maximum output.					
<b>Frequency range</b>	125Hz to 8kHz (Optional High Frequency: 8 kHz to 20 kHz) 125Hz, 250Hz, 750Hz, 1500Hz and 8kHz may freely be deselected					
<b>Speech</b>	<b>Frequency Response:</b> (Typical)		<b>Linear [dB]</b>		<b>FFeq<sub>uv</sub> [dB]</b>	
		<b>Frequency</b> [Hz]	<b>Ext. sign<sup>1</sup></b>	<b>Int. sign<sup>2</sup></b>	<b>Ext. sign<sup>1</sup></b>	<b>Int. sign<sup>2</sup></b>
	TDH39 (IEC 60318-3 Coupler)	125-250	+0/-2	+0/-2	+0/-8	+0/-8
		250-4000	+2/-2	+2/-1	+2/-2	+2/-2
	DD45 (IEC 60318-3 Coupler)	4000-6300	+1/-0	+1/-0	+1/-0	+1/-0
		125-250	+0/-2	+1/-0	+0/-8	+0/-7
		250-4000	+1/-1	+1/-1	+2/-2	+2/-3
	E.A.R Tone 3A (IEC 60318-5 Coupler)	4000-6300	+0/-2	+0/-2	+1/-1	+1/-1
		250-4000	+2/-3	+4/-1	(Non linear)	
	IP 30 (IEC 60318-5 Coupler)	250-4000	+2/-3	+4/-1	(Non linear)	
B71 Bone Conductor (IEC 60318-6 Coupler)	250-4000	+12/-12	+12/-12	(Non linear)		
	2% THD at 1000 Hz max output +9 dB (increasing at lower frequency) Level range: -10 to 60 dB HL					
	1. Ext. sign: CD input		2. Int. sign: Wave files			
<b>External signal</b>	Speech replaying equipment connected to the CD inputs must have a signal-to-noise ratio of 45 dB or higher. The speech material used must include a calibration signal suitable for adjusting the input to 0 dBVU.					
<b>Free Field output (non-powered)</b>	<u>Power amplifier and loudspeakers</u> With an input of 7 V <sub>rms</sub> - Amplifier and loudspeakers must be able to create a Sound Pressure Level of 100 dB in a distance of 1 meter - and meet the following requirements: Frequency Response 125-250 Hz +0/-10 dB 250-4000 Hz ±3 dB 4000-6300 Hz ±5 dB Total Harmonic Distortion 80 dB SPL < 3% 100 dB SPL < 10%					
<b>Internal storage</b>	500 patients and 50.000 sessions/measurements/audiograms (may depend on session type/size)					
<b>Signal Indicator(VU)</b>	Time weighting: 300mS Dynamic range: 23dB Rectifier characteristics: RMS Selectable inputs are provide with an attenuator by which the level can be adjusted to the indicator reference position(0dB)					
<b>Data Connections (sockets) for connection of accessories</b>	4 x USB A 1 x USB B for PC connection (compatible with USB 1.1 and later) 1 x LAN Ethernet (not used)					
<b>External devices (USB)</b>	Standard PC mouse and keyboard (for data entry) Supported printers: Please contact local distributor for a list of approved PC printers.					
<b>HDMI output</b>	Provides a copy of the built-in screen in HDMI format 800x600 resolution					
<b>Input Specifications</b>	TB	212 uV <sub>rms</sub> at max. gain for 0dB reading Input impedance : 3.2KOhm				
	Mic.2	212 uV <sub>rms</sub> at max. gain for 0dB reading Input impedance : 3.2KOhm				
	CD1/2	16mV <sub>rms</sub> at max. gain for 0dB reading Input impedance : 47KOhm				
	TF (side panel)	212uV <sub>rms</sub> at max. gain for 0dB reading Input impedance : 3.2KOhm				
	TF (front panel)	212uV <sub>rms</sub> at max. gain for 0dB reading Input impedance : 3.2KOhm				
	Wave files	Plays wave file from internal SD card				
<b>Output Specifications</b>	FF 1/2/3/4 Line output	7V <sub>rms</sub> at 2KOhms load 60-20000Hz -3dB				

	FF 1 / 2 / 3 / 4 - powered	4x20W (only 2x20W can be used by software at the moment)
	Left & Right	7Vrms at 10 Ohms load 60-20000Hz -3dB
	Ins. Left & Right	7Vrms at 10 Ohms load 60-20000Hz -3dB
	HF Left & Right	7Vrms at 10 Ohms load 60-20000Hz -3dB
	HLS	7Vrms at 10 Ohms load 60-20000Hz -3dB
	Bone 1+2	7Vrms at 10 Ohms load 60-20000Hz -3dB
	Ins. Mask	7Vrms at 10 Ohms load 60-20000Hz -3dB
	Monitor headset (side panel)	2x 3Vrms at 32 Ohms / 1.5Vrms at 8 Ohms load 60-20000Hz -3dB
	Assist Mon.	Max.3.5Vrms. by 8 Ω load 70Hz-20kHz ±3dB
<b>Display</b>	8.4 inch high resolution colour display 800x600 pixels	
<b>Compatible software</b>	Diagnostic Suite - Noah, OtoAccess and XML compatible	
<b>Dimensions (LxWxH)</b>	522 x 366 x 98 cm / 20.6 x 14.4 x 3.9 inch Height with display open: 234 mm / 9.2 inch	
<b>Weight</b>	7.9kg / 17.4lb	
<b>Power supply</b>	110V~/0.65A – 240V~/0.3A 50-60Hz Rated at: 2x20W, 1kHz pure-tone, NBN 1kHz	
<b>Operation environment</b>	Temperature:	15-35°C
	Re. Humidity:	30-90% Non condensing
	Ambient pressure:	98-104 kPa
<b>Transport and storage</b>	Transport temperature:	-20-50°C
	Storage temperature:	0-50°C
	Re. Humidity:	10-95% Non condensing
<b>Warm up time</b>	Approx. 1 minute	