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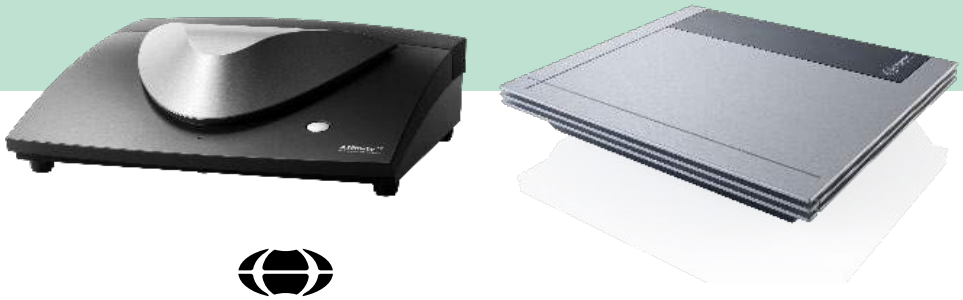
Technical Specifications

Affinity$^{2.0}$/ Equinox$^{2.0}$



Interacoustics

D-0105961-L – 2022/05

Included and optional parts

AC440	REM440	HIT440

Included parts:
• Affinity Suite
• DD45[1] Audiometric headset
• MTH400 headset
• EMS400 Talk back microphone
• B81 Bone conductor[1]
• APS3 Patient response button[1]
• Standard USB cable
• Power cable 120 or 230V
• Mouse pad
 	
Optional parts:
• TDH39[1] Audiometric headset
• DAK70 Audiometer keyboard with live voice mic.
• IP30 insert earphones1
• B81 Bone Conductor[1]
• B71 Bone Conductor[1/2]
• ACC60 Affinity2.0 carrying case
• Audiocup enclosures
• Peltor noise excluding headset[1/2]
• HDA300 Audiometric headset[1]
• DD450 high frequency headset[1]
• AP70 Power amplifier 2x70 Watt
• SP90 Loudspeaker
• SP85A Loudspeaker
• SP90A Loudspeaker
• AFC8 Sound cabin installation panel
• Accessory bracket
• OtoAccess® database
• Optical USB 1.1 isolation extension cable
	Included parts:
	• Affinity Suite
	• IHM60 In-situ headset with probe microphone and reference microphone[1/2] (double)
	• Probe tubes, 36 pcs.[1]
	• Standard USB cable
	• Power cable 120 or 230V
	• Mouse pad
	
	Optional parts:
	• Coupler box:
	  ○ 2cc coupler
	  ○ ½" microphone
	  ○ Reference mic.
	  ○ ITE adaptor
	  ○ BTE adapter
	  ○ Body HA adaptor
	  ○ BTE tubing
	• SPL60 Transducer kit for RECD measurement including probes
	• Assortment box with eartips for RECD measurement
	• Aidapters
	• Calibration adaptor for in-situ reference
	• Optical USB [1].1 isolation extension cable
	• ACC60 Affinity2.0 carrying case
	• Coupler microphone extension cable
	• Accessory bracket
	• OtoAccess® database
		Included parts:
		• Affinity Suite
		• Coupler box:
		  ○ 2cc coupler
		  ○ ½" microphone
		  ○ Reference mic.
		  ○ ITE adaptor
		  ○ BTE adapter
		  ○ Body HA adaptor
		  ○ BTE tubing
		• Coupler seal wax
		• Aidapters
		• Reference microphone
		• Standard USB cable
		• Power cable 120 or 230V
		• Mouse pad
		
		Optional parts:
		• Battery adapters BAA675, BAA13, BAA312, BAA10, BAA5
		• TBS25M External test chamber incl. cables
		• ACC60 Affinity2.0 carrying case
		• Calibration adaptor
		• Optical USB [1].1 isolation extension cable
		• SKS10 Skull Simulator with power supply
		• OtoAccess® database

General technical specifications

Affinity2.0 Hardware - technical specifications

Medical CE-mark:	The CE-mark in combination with MD symbol indicates that Interacoustics A/S meets the requirements of the Medical Device Regulation (EU) 2017/745 Annex I Approval of the quality system is made by TÜV – identification no. 0123.	
Safety Standards	IEC 60601-1: 2005 + CORR. 1:2006 + CORR. 2:2007 + A1:2012 ANSI/AAMI ES60601-1:2005 + A2:2010 + A1:2012 CAN/CSA-C22.2 No. 6061-1:14 Class I, Applied parts type B	
EMC Standard	IEC 60601-1-2	
Audiometer Standards	Tone Audiometer: IEC 60645 -1, ANSI S3.6, Type 1 Speech Audiometer: IEC 60645-1, ANSI S3.6 Type B or B-E.	
Calibration	Technical information is located in the specifications for the software modules. Calibration information and instructions are located in the Service manual.	
PC requirements:	2 GHz Intel i3 processor 4GB Ram 2.5 GB available disk space 1024x768 resolution (1280x1024 or higher recommended) Hardware accelerated DirectX/Direct3D graphics card. One or more USB ports, version 1.1 or higher.	
Operative System:	Windows® 8 (64 bit) Windows® 10 (64 bit) Windows® 11 (64 bit)	
Compatible software	Noah 4, OtoAccess® and XML compatible	
Input Specifications	**Talk Back**	330µVrms at max. input gain for 0dB VU-reading Input impedance: 47.5KΩ
	Mic. 1/TF & Mic. 2	
	Pat. Resp. L & R	Switches 3.3V to the logic input. (The switch current is 33µA)
	Inp. Aux. 1 & 2	20mVrms at max. input gain for 0dB VU-reading Input impedance : 15KΩ
	TB Coupler	
	TB Coupler - internal TB (Affinity2.0 .0 only)	
	Insitu L & R - Probe mic.	
	CD1 & CD2	10mVrms at max input gain for 0dB VU-reading Input impedance: 10kΩ
	TB Ref.	7mVrms at max. input gain for 0dB VU-reading Input impedance : 4,3KΩ
	TB Ref – internal TB (Affinity2.0 .0 only)	
	Insitu L & R - Ref. mic	
	Ref.Mic./Ext.	Not in use
	Coupler/Ext.	
	Wave files	Plays wave file from hard disk drive
Output Specifications	**FF1 / FF2 (Terminal Block)**	Up to 12.6Vrms by 8 Ω load 70Hz-20kHz ±3dB Minimum speaker impedance: 4Ω
	TB Lsp.	
	FF1/ FF2	Up to 7Vrms by 600Ω load 70Hz-20kHz ±3dB
	Sp 1, Sp 2, Sp 3, Sp 4	
	Left, Right	Up to 7.0Vrms by 10Ω load

	Ins. Left, Ins. Right	70Hz-20kHz ±3dB
	Bone	
	Ins. Mask.	
	HF/HLS	
	Insitu L, Insitu R	
	Monitor, Ass. Mon.	Max.3.5Vrms. by 8 Ω load 70Hz-20kHz ±3dB
	Sp. 1-4 Power Out	
	DC	Voltage: 5VDC Current: 0.5A
	TB Loop	Up to 100mA/meter 70Hz-20kHz ±3dB
	FF Loop	
	Batt. Sim.	Voltage: 1.1 – 1.6VDC Impedance range: 0 – 25 Ω.
	Batt. Sim. - Internal TB (Affinity2.0 ·0 only)	
Data Connections	**USB/PC**	USB B socket for connection to PC (compatible with USB 1.1 and later)
	USB	USB A socket for connection of other USB devices (Internal USB 1.1 hub)
	Keyb.	Serial Peripheral Interface Bus (SPI interface) Check the Service manual for more information.
Internal test box:	Built in test box holds telecoil drive as well as special dual speaker set for checking directional microphone function.	
Dimensions (LxWxH)	Affinity$^{2.0}$: 42 x 38 x 14 cm / 16.5 x 15 x 5.5 inches	
Weight	Affinity$^{2.0}$: 5.5 kg / 12.1 lbs.	
Power supply	100-240 V~, 50-60Hz	
Power Consumption:	195VA	
Operation environment	Temperature: 15-35° Re. Humidity: 30-90% Non condensing Ambient pressure range: 98kPa o 104kPa	
Transport and storage	Transport temperature: -20-50°C Storage temperature: 0-50°C Re. Humidity: 10-95% Non condensing	

Technical specifications of the AC440 software

Medical CE-mark:	The CE-mark in combination with MD symbol indicates that Interacoustics A/S meets the requirements of the Medical Device Regulation (EU) 2017/745 Annex I Approval of the quality system is made by TÜV – identification no. 0123.	
Audiometer Standards:	Tone: IEC60645-1 2017/ANSI S3.6 2018 Type 1 EHF Speech: IEC60645-1 2017 /ANSI S3.6 2018 Type A or A-E	
Transducers & Calibration:	Calibration information and instructions are located in the Service manual. Check the accompanying Appendix for RETSPL levels for transducers	
	Air Conduction	
	DD45	ISO 389-1 2017, ANSI S3.6-2018 Headband Static Force 4.5N ±0.5N
	TDH39	ISO 389-1 2017, ANSI S3.6-2018 Headband Static Force 4.5N ±0.5N
	HDA300	PTB report 1.61.4066893/13 Headband Static Force 8,8N ±0.5N
	DD450	ISO 389-8 2004, ANSI S3.6-2018 Headband Static Force 10N ±0.5N
	HDA280	PTB report 2004 Headband Static Force 5N ±0.5N
	E.A.R Tone 5A	ISO 389-2 1998, ANSI S3.6-2018
	IP30	ISO 389-2 1998, ANSI S3.6-2018
	Bone Conduction	Placement: Mastoid
	B71	ISO 389-3 2016, ANSI S3.6-2018 Headband Static Force 5.4N ±0.5N
	B81	ISO 389-3 2016, ANSI S3.6-2018 Headband Static Force 5.4N ±0.5N
	Free Field	ISO 389-7 2005, ANSI S3.6-2010
	High Frequency	ISO 389-5 2004, ANSI S3.6-2010
	Effective masking	ISO 389-4 1994, ANSI S3.6-2010
Patient Response switch:	Handheld push button.	
Patient communication:	Talk Forward and Talk Back.	
Monitor:	Output through external earphone or speaker.	
Stimuli:	Pure tone, Warble tone, NB, SN, WN, TEN noise	
	Tone	125-20000Hz separated in two ranges 125-8000Hz and 8000-20000Hz. Resolution 1/2-1/24 octave.
	Warble Tone	1-10 Hz sine +/- 5% modulation
	Wave file	44100Hz sampling, 16 bits, 2 channels
	Masking	Automatic selection of narrow band noise (or white noise) for tone presentation and speech noise for speech presentation.
	Narrow band noise:	IEC 60645-1:2001, 5/12 Octave filter with the same center frequency resolution as pure Tone.
	White noise:	80-20000Hz measured with constant bandwidth
	Speech Noise.	IEC 60645-1:2017 125-6000Hz falling 12dB/octave above 1KHz +/-5dB
	Presentation	Manual or Reverse. Single or multiple pulses. pulse time adjustable from 200mS-5000mS in 50mS steps. Simultaneous or alternating.
	Intensity	Check the accompanying Appendix for maximum output levels
	Steps	Available Intensity Steps is 1, 2 or 5dB
	Accuracy	Sound pressure levels: ± 2 dB Vibration force levels: ± 5 dB
	Extended range function	If not activated, the Air Conduction output will be limited to 20 dB below maximum output.
	Frequency	Range: 125Hz to 8kHz (Optional High Frequency: 8 kHz to 20 kHz) Accuracy: Better than ± 1 %
	Distortion (THD)	Sound pressure levels: below 1.5 % Vibration force levels: below 3 %.

Signal Indicator (VU)	Time weighting: 350mS Dynamic range: -20dB to +3dB Rectifier characteristics: RMS Selectable inputs are provided with an attenuator by which the level can be adjusted to the indicator reference position(0dB)
Storing capability:	Tone audiogram: dB HL, MCL, UCL, Tinnitus, R+L Speech Audiogram: WR1, WR2, WR3, MCL, UCL, Aided, Unaided, Binaural, R+L.
Compatible Software:	Noah 4, OtoAccess® and XML compatible

REM440 software - technical specifications

Medical CE-mark:	The CE-mark in combination with MD symbol indicates that Interacoustics A/S meets the requirements of the Medical Device Regulation (EU) 2017/745 Annex I Approval of the quality system is made by TÜV – identification no. 0123.	
Real Ear Measurement Standards:	IEC 61669 2015, ANSI S3.46 2013	
Stimuli:	Warble Tone, Pure Tone, Random noise, Pseudo random noise, Band limited white noise, Chirp, ICRA, Real Speech, any other sound file (automatic calibration available).	
Frequency range:	100Hz – 10kHz	
Frequency accuracy:	Less than ± 1 %	
Distortion:	Less than 2%	
Intensity range:	40 – 90 dB	
Intensity accuracy:	Less than ± 1.5 %	
Measurement Intensity Range:	Probe microphone 40-145 dB SPL ± 2 dB.	
Frequency Resolution:	1/3, 1/6, 1/12, 1/24 octave or 1024-point FFT.	
Probe microphone:	Intensity: 40 – 140 dB	
Reference microphone:	Intensity: 40 – 100 dB	
Intensity Accuracy:	Less than ± 1.5 dB	
Cross talk	Cross talk in the probe and probe tube will alter the obtained results with less than 1 dB at all frequencies.	
Available tests:	REUR REUG REIG RECD REAR REAG REOR	REOG Input – Output FM Transparency Ear Level, FM only Directionality Visible speech mapping
Compatible Software:	Noah 4, OtoAccess® and XML compatible	

HIT440 software - technical specifications

Medical CE-mark:	The CE-mark in combination with MD symbol indicates that Interacoustics A/S meets the requirements of the Medical Device Regulation (EU) 2017/745 Annex I Approval of the quality system is made by TÜV – identification no. 0123.		
Hearing Aid Analyzer Standards:	IEC 60118-0 2015, IEC 60118-7 2005, ANSI S3.22 2014		
Frequency Range:	100-10000Hz.		
Frequency Resolution:	1/3, 1/6, 1/12 and 1/24 octave or 1024-point FFT.		
Frequency Accuracy:	Less than ± 1 %		
Stimulus Signal:	Warble Tone, Pure Tone, Random noise, Pseudo random noise, Band limited white noise, Chirp, ICRA, Real Speech, any other sound file (automatic calibration available).		
Sweep Speed:	1,5 – 12 sec.		
FFT:	Resolution 1024 points. Averaging: 10 – 500.		
Stimulation Intensity Range:	40-100 dB SPL in 1 dB step.		
Intensity Accuracy:	Less than ± 1.5 dB		
Measurement Intensity Range:	Probe microphone 40-145 dB SPL ± 2 dB		
Stimulus Distortion:	Less than 1 % THD.		
Battery Simulator:	Standard and custom types are selectable		
	Standard battery	*Impedance[Ω]*	*Voltage[V]*
	Zinc air 5	8	1.3
	Zinc air 10	6	1.3
	Zinc air 13	6	1.3
	Zinc air 312	6	1.3
	Zinc air 675	3.5	1.3
	Mercury 13	8	1.3
	Mercury 312	8	1.3
	Mercury 657	5	1.3
	Mercury 401	1	1.3
	Silver 13	10	1.5
	Silver 312	10	1.5
	Silver 76	5	1.5
	Custom types	0 – 25	1.1 – 1.6
Available tests:	Additional tests can be designed by user		
	OSPL90 Full On Gain Input/output Attack/Recovery Time Reference Test Gain Frequency Response Equivalent Input Noise	Harmonic Distortion Intermodulation Distortion Battery Current Drain Microphone Directionality Coil Frequency Response Coil Harmonic Distortion Coil Full-On Gain Response	
Pre-Programmed Protocols:	HIT440 software comes with a set of Test Protocols loaded. Additional Test Protocols can be designed by user, or easily imported into the system.		
Compatible Software:	Noah 4, OtoAccess® and XML compatible		