

ENT diagnostic

Audiometry, Neurotology, Vestibulardiagnostic



More than 30 years experience in the ENT medical field

Diagnostic

Ultrasonic a-scan US 4000 (PC-based module)



Ultrasonic examinations have become more and more important in today's medicine. Ultrasonic impulses are sent through sinus-maxillaris and sinus-frontalis. The ultrasonic probe serves as transmitter for ultrasonic impulses, as well as receiver for the echos. The runtime of the echos is similar to the structures in the sinus. Echos are formed at a change of the acoustic impedance, between bone and tissue, bone and liquid as well as between all solid or liquid matter and air. The bigger the difference in impedance, the stronger the reflection.

A part of the energy is reflected at the transition from the front bone to the mucous. In a healthy sinus the rest of the energy is reflected at the end of the mucous membrane, no late echos appear. If the sinus is filled with liquid, nearly all energy crosses the sinus and is reflected at the backwall of the sinus. Swelling of the mucous membrane or cysts produces a typical double echo. For examination of the sinusfrontalis, the depth scale and the amplification is automatically changed by the system.

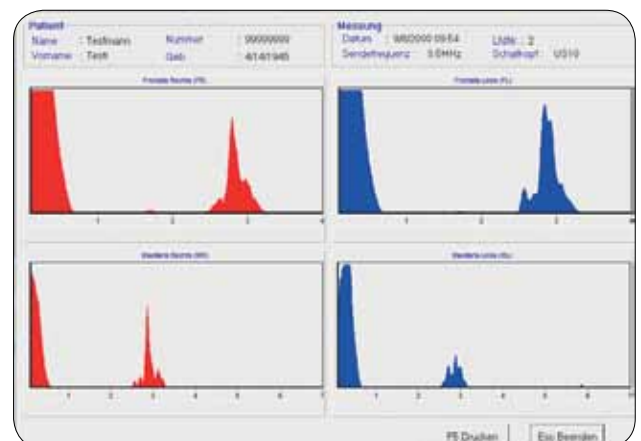
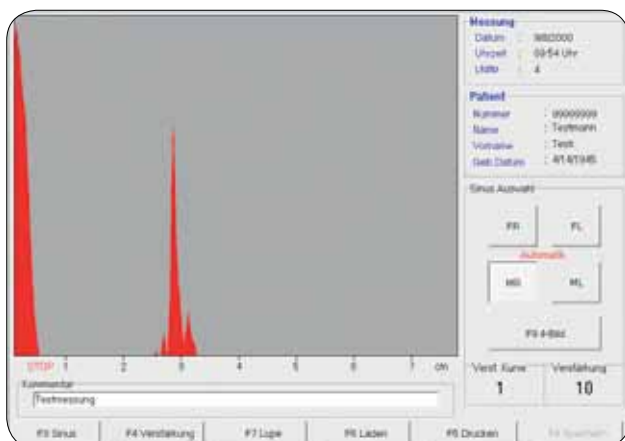
The ultrasonic method is quick and easy to carry out, it is very user-friendly and completely without any dangerous side effects. It is specially used for progress reports of sinusitis patients. The measurement takes only a few seconds and is very reliable, no computer experience is required. The method of ultrasonic serves as a supplement or replacement of the x-ray, especially by its considerable inexpensive costs. In Germany in every ENT practice ultrasonic is used.

For comparison, four sinus pictures can be stored. The depth amplification is stored in four curves that are able at the election. The linear amplification can be adjusted digital and linear. All data and measured curves are stored automatically at the harddisc of the computer. For printouts all Windows printers are available.

Technical Details:

System:	PC module with USB 2.0 interface
System requirements:	Pentium PC min. 500 MHz, USB 2.0 Port, Windows XP, 7, 8, 10 (32/64 Bit)
Method:	A-mode
Probe:	focussed, 10 mm diameter
Probe frequency:	3,5 MHz
Impuls frequency:	120 Hz
Probe power:	1,2 mW/cm ²
Total amplification:	80 dB
Depth amplification:	20 dB
Depth range:	Sinus frontalis - 3,5 cm Sinus maxillaris - 7,5 cm
Switchover:	automatical or manual by footswitch
Depth amplification:	<ul style="list-style-type: none"> • for maxillaris • for frontalis • for cysts • for small signals
Comment line:	per sinus
Patients data:	Paradox database
Power supply:	13,2 V, external power supply 100-240 V, 50/60 Hz, 30 W
Dimensions:	330 x 80 x 265 mm (WxHxD)
Accessories:	Ultrasound probe, bottle sonogel, footswitch, probe holder, USB cable, Installation-CD, power supply, manual

Technical modifications possible



Middle Ear Diagnostic

Tympanometer Tymp 4000-M (PC-based module)



Tymp 4000-M PC-diagnostic module it is able to do a full-automatic impedance measurement within a few seconds. Every function, as well as curves and data is presented at the PC monitor. The results can be verified before documentation to avoid misprintings.

The device is used in the doctors practice as well as in the clinic. The measurement of the compliance lasts only two seconds and works excellent used on children and restless patients. The test results are objective and independent from the assistance of the patient. Because of the extreme easy way to use, the examination can be made directly at the working place and fits in well into the general examination.

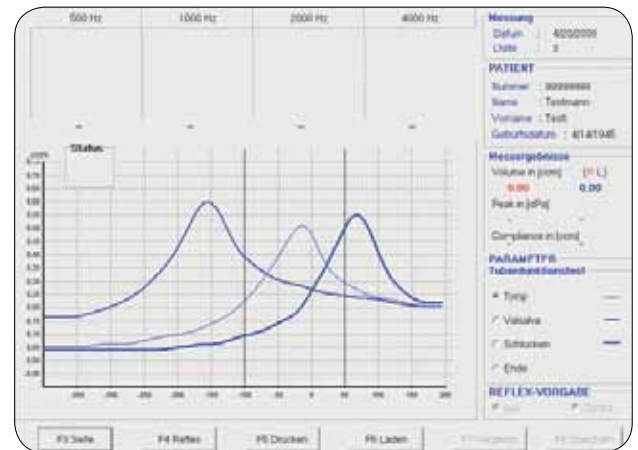
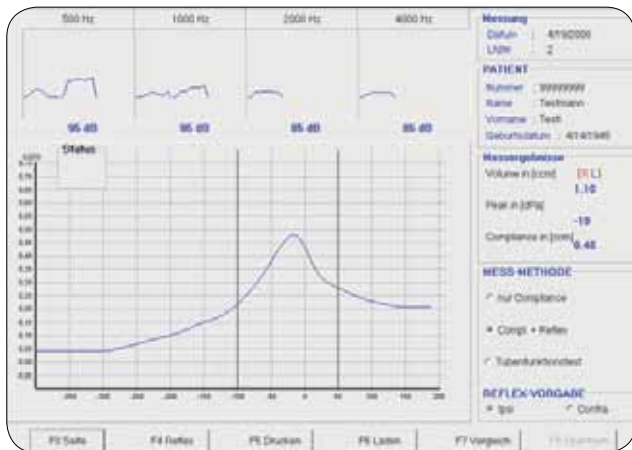
The test automatic enables to operate the Tymp 4000 with only one hand, so the head of the patient can be held steady with the other hand. For measurement the probe is held against the outer ear. A two coloured lamp on top of the handle indicates the correct fitting of the probe and the measurement is starting automatically. It is possible to measure the stapedius reflex ipsi- and contralateral. During this measurement, the middle ear pressure is held in the outer ear canal.

The data and measured curves can be stored on harddisc or transmitted to a practice software.

Technical Details:

System:	PC module with USB 2.0 interface
Probetone:	226 Hz, 85 dB SPL
Pressure range:	+200 to -400 daPa
Pressure delta:	300 daPa/sec
Measure time:	2 sec. for Compliance
Reflex tones:	500, 1000, 2000 and 4000 Hz at 85, 95 and 105 dB SPL
Reflex recognition:	automatically
Reflexes:	ipsi and contralateral
Pressurecalibration:	automatically at start
State indication:	LED 3-colours in probe, detailed display symbols
Dimensions:	330 x 80 x 265 mm (WxHxD)
Power supply:	13,2 V, external power supply 100-240 V, 50/60 Hz, 30 W
Accessories:	probe with cable, 1 set ear plugs, headphone DD 45 C (option), probe holder, USB cable, power supply, Installations-CD, manual

Technical modifications possible



Diagnostic

Rhinomanometer Rhino 4000-M (PC-based module)



With the Rhino 4000-M PC-module a measuring-method was evolved, allowing the adaptation via nose plugs and alternatively via a face mask. The method is used in the doctors practice as well as in clinics. All functions, data and diagrams are shown on the PC monitor. Herewith the results can be verified before documentation to avoid misprintings.

The time-saving adaptation via nose-plugs allows a direct use at the doctors working-place, so the measurement fits into the normal examination. All calculation of flow, pressure, percentage and resistance-coefficient are done in realtime, so by the end of the measurement the complete results are present. Persons with bearts, long hair and children with fear of masks, can be measured without any problems. For clinical use a face-half-mask is available. During the measurement the intensity of breathing can be controlled via two measuring bars. The measurement is carried out anterior under the physiological conditions of self-breathing and allows a quantitatively objective statement about the resistance-status of the nose.

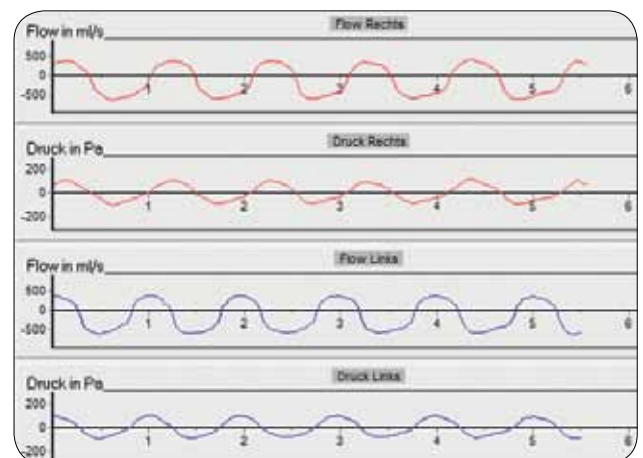
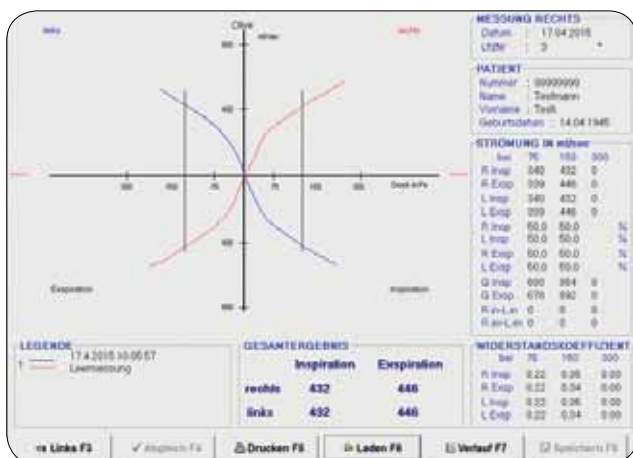
Because of microprocessor controlling the use is very easy, so the measurement can be carried out by the medical personnel. The mean of max. five flow curves is calculated and shown in the diagram as flow-pressure curves. Also the flow-values for a difference-pressure of 75 Pa, 150 Pa and 300 Pa are calculated and shown in the screen, together with the percentage of right- and left-side flow. For clinical use the coefficient of the resistance is calculated.

All data and measured curves can be stored on hard disc, if the device is connectet to a PC. For printouts is used an extremely fast digital-printer, working very noiseless and economical.

Technical Details:

System:	PC- module with USB 2.0 interface
System requirements:	Pentium PC min. 500 MHz, USB 2.0 Port, Windows XP, 7, 8, 10 (32/64 Bit)
Method:	anterior self-breathing
Airflow:	0 - 900 ml /s in- and expiration
Pressure difference:	0-50 daPa
Function control:	two measuring-bars in the display
Averaging:	max. 5 flow-curves
Pressure calibration:	automatic before start, manual
Visualization:	diagram and numeric values
Automatic calculation of:	<ul style="list-style-type: none"> • pressure in daPa • flow in ml /sec incl. total-flow • percentage • resistance-coefficients • Point 2-5 at 75, 150 and 300 daPa
Dimensions:	330 x 80 x 265 mm (WxHxD)
Power supply:	13,2 V, external power supply 100-240 V, 50/60 Hz, 30 W
Accessories:	12 nose-plugs (olives), 2 flow-probes, 2 sets of hoses, foot pedal, probe holder, USB cable, power supply, nstallations-CD, manual
Special accessories:	face-halfmask
Application:	<ul style="list-style-type: none"> • Proof of allergies after provocation • Diagnostics at handicapped nose-breathing • Function control after nose operation • Control after dispensation of medicines

Technical modifications possible



Combined diagnostic equipment

Combi 4000-M (PC-based module)



Combi 4000-M PC-module combines a perfect ENT-diagnostic and a modern design. Through the double function of tympanography and rhinomanometry you save costs and space.

In the Tymp-Mode, the Combi 4000-M diagnostic module it is able to do a full-automatic impedance measurement within a few seconds. Every function, as well as curves and data is presented at the PC monitor. The results can be verified before documentation to avoid misprintings. The test automatic enables to operate the Tymp 4000 with only one hand, so the head of the patient can be held steady with the other hand. For measurement the probe is held against the outer ear. A two coloured lamp on top of the handle indicates the correct fitting of the probe and the measurement is starting automatically. It is possible to measure the stapedius reflex ipsi- and contralateral. During this measurement, the middle ear pressure is held in the outer ear canal.

In the Rhino-Mode, time saving adaptation via nose plugs allows a direct use at the doctors working-place, so the measurement fits within the normal examination. All calculation of flow, pressure, percentage and resistance coefficient is done in real time, so with completion of the measurement all results are present. Persons with beards, long hair and children with fear of masks, can be measured, too. For clinical use, a face-half-mask is available, too. During the measurement the intensity of breathing can be controlled via two measuring bars. The measurement is carried out anterior under physiological conditions of self-breathing and allows a quantitatively objective statement of the resistance behaviour of the nose.

All calculation of flow, pressure, percentage and resistance coefficient are done in real time, so that with the end of the measurement the complete results are present. All functions, as well as curves and data are presented at the PC monitor. The results can be verified before documentation to avoid miss-printings. The data and measured curves can be stored at the PC or transmitted to a practice software.

Technical Details Combi 4000-M:

System:	PC module with USB 2.0 interface
System requirements:	Pentium PC min. 500 MHz, USB 2.0 Port, Windows XP, 7, 8, 10 (32/64 Bit)
Dimensions:	330 x 80 x 265 mm (WxHxD)
Power supply:	13,2 V, external power supply 100-240 V, 50/60 Hz, 30 W
Accessories Rhinomanometer:	12 nose-plugs (olives), 2 flow-probes, 2 sets of hoses, foot pedal, probe holder, USB cable, power supply, installations-CD, manual
Optional Accessories:	face-half mask
Accessories Tympanometer:	probe with cable, 1 set ear plugs, headphone DD 45 C (option), probe holder, USB cable, power supply, installations-CD, manual

Tympanometer:

System:	impedance- and reflex measurement
Probetone:	226 Hz, 85 dB SPL
Pressure range:	+200 to -400 daPa
Pressure delta:	300 daPa/sec
Measure time:	2 sec. for Compliance
Reflex tones:	500, 1000, 2000 and 4000 Hz at 85, 95 and 105 dB SPL
Reflex recognition:	automatically
Reflexes:	ipsi and contralateral
Pressurecalibration:	automatically at start
State indication:	LED 3-colours in probe, detailed display symbols
Changeover right/left:	automatic or manual

Rhinomanometer:

Method:	anterior self-breathing
Airflow:	0 - 900 ml /s in- and expiration
Pressure difference:	0-50 daPa
Function-control:	two measuring-bars in the display
Averaging:	max. 5 flow-curves
Pressure calibration:::	automatic before start or manual
Visualization:	diagram and numeric values
Auto. calculation of:	pressure in daPa; flow in ml /sec incl. total-flow; percentage; resistance-coefficients; Point 2-5 at 75, 150 and 300 daPa
Application:	Proof of allergies after provocation; Diagnostics at handicapped nose breathing; Function control after nose operation; Control after dispensation of medicines

Technical modifications possible

Combined diagnostic equipment

Center 4000-M UTR (PC-based module)



Center 4000-M PC-module combines a perfect ENT-diagnostic and a modern design. Through the triple function of tympanography, rhinomanometry and ultrasound you save costs and space.

In the Tymp-Mode it is able to do a full-automatic impedance measurement within a few seconds. Every function, as well as curves and data is presented at the PC monitor. The results can be verified before documentation to avoid misprintings. The test automatic enables to operate the Tymp4000 with only one hand, so the head of the patient can be held steady with the other hand. For measurement the probe is held against the outer ear. A two coloured lamp on top of the handle indicates the correct fitting of the probe and the measurement is starting automatically. It is possible to measure the stapedius reflex ipsi- and contralateral. During this measurement, the middle ear pressure is held in the outer ear canal.

In the Rhino-Mode, time saving adaptation via nose plugs allows a direct use at the doctors working-place, so the measurement fits within the normal examination. All calculation of flow, pressure, percentage and resistance coefficient is done in real time, so with completion of the measurement all results are present. Persons with beards, long hair and children with fear of masks, can be measured, too. For clinical use, a face-half-mask is available, too. During the measurement the intensity of breathing can be controlled via two measuring bars. The measurement is carried out anterior under physiological conditions of self-breathing and allows a quantitatively objective statement of the resistance behaviour of the nose.

All calculation of flow, pressure, percentage and resistance coefficient are done in real time, so that with the end of the measurement the complete results are present. All functions, as well as curves and data are presented at the PC monitor. The results can be verified before documentation to avoid miss-printings. The data and measured curves can be stored at the PC or transmitted to a practice software.

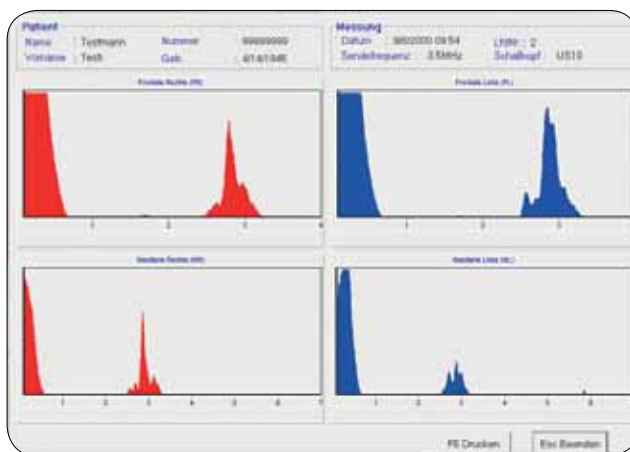
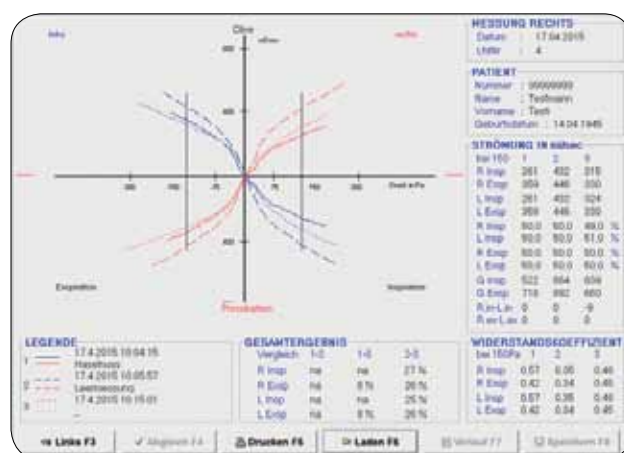
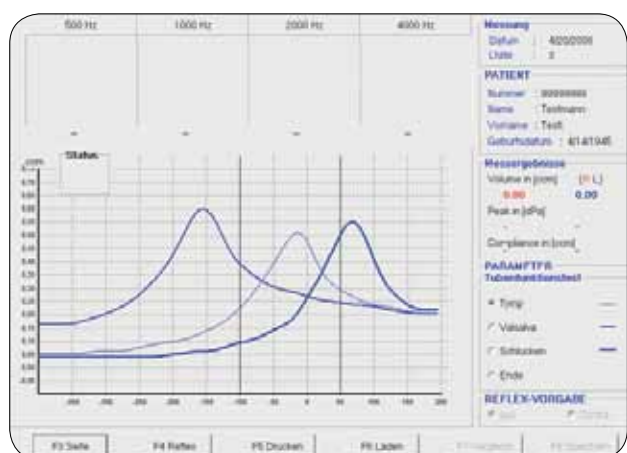
Ultrasonic examinations have become more and more important in today's medicine. Ultrasonic impulses are sent through sinus-maxillaris and sinus-frontalis. The ultrasonic probe serves as transmitter for ultrasonic impulses, as well as receiver for the echos. The runtime of the echos is similar to the structures in the sinus. Echos are formed at a change of the acoustic impedance, between bone and tissue, bone and liquid as well as between all solid or liquid matter and air. The bigger the difference in impedance, the stronger the reflection.

A part of the energy is reflected at the transition from the front bone to the mucous. In a healthy sinus the rest of the energy is reflected at the end of the mucous membrane, no late echos appear. If the sinus is filled with liquid, nearly all energy crosses the sinus and is reflected at the backwall of the sinus. Swelling of the mucous membrane or cysts produces a typical double echo. For examination of the sinusfrontalis, the depth scale and the amplification is automatically changed by the system.

The ultrasonic method is quick and easy to carry out, it is very user-friendly and completely without any dangerous side effects. It is specially used for progress reports of sinusitis patients. The measurement takes only a few seconds and is very reliable, no computer experience is required. The method of ultrasonic serves as a supplement or replacement of the x-ray, especially by its considerable inexpensive costs. In Germany in every ENT practice ultrasonic is used.

For comparison, four sinus pictures can be stored. The depth amplification is stored in four curves that are able at the election. The linear amplification can be adjusted digital and linear. All data and measured curves are stored automatically at the harddisc of the computer. For printouts all Windows printers are available.

For technical details see the description of US 4000 and Combi 4000-M



Combined diagnostic equipment

Center 4000-M UT (PC-based module)



Center 4000-M PC-module combines a perfect ENT-diagnostic and a modern design. Through the double function of tympanography and ultrasound you save costs and space.

In the Tymp-Mode it is able to do a full-automatic impedance measurement within a few seconds. Every function, as well as curves and data is presented at the PC monitor. The results can be verified before documentation to avoid misprintings. The test automatic enables to operate the Tymp 4000 with only one hand, so the head of the patient can be held steady with the other hand. For measurement the probe is held against the outer ear. A two coloured lamp on top of the handle indicates the correct fitting of the probe and the measurement is starting automatically. It is possible to measure the stapedius reflex ipsi- and contralateral. During this measurement, the middle ear pressure is held in the outer ear canal.

The ultrasonic method is quick and easy to carry out, it is very user-friendly and completely without any dangerous side effects. It is specially used for progress reports of sinusitis patients. The measurement takes only a few seconds and is very reliable, no computer experience is required. The method of ultrasonic serves as a supplement or replacement of the x-ray, especially by its considerable inexpensive costs. In Germany in every ENT practice ultrasonic is used. For comparison, four sinus pictures can be stored. The depth amplification is stored in four curves that are able at the election. The linear amplification can be adjusted digital and linear. All data and measured curves are stored automatically at the harddisc of the computer. For printouts all Windows printers are available.

All calculation of flow, pressure, percentage and resistance coefficient are done in real time, so that with the end of the measurement the complete results are present. All functions, as well as curves and data are presented at the PC monitor. The results can be verified before documentation to avoid miss-printings. The data and measured curves can be stored at the PC or transmitted to a practice software.

Technical Details Center 4000-M UT:

System:	PC module with USB 2.0 interface
System requirements:	Pentium PC min. 500 MHz, USB 2.0 Port, Windows XP, 7, 8, 10 (32/64 Bit)
Dimensions:	330 x 120 x 265 mm (WxHxD)
Power supply:	13,2 V, external power supply 100-240 V, 50/60 Hz, 30 W
Weight:	3,7 kg
Accessories Tympanometer:	probe with cable, 1 set ear plugs, headphone DD 45 C (option), probe holder, USB cable, power supply, installations-CD, manual
Accessories Ultrasound:	Ultrasound probe, bottle sonogel, footswitch, probe holder, USB cable, installation-CD, power supply, manual

Tympanometer:

System:	impedance- and reflex measurement
Probetone:	226 Hz, 85 dB SPL
Pressure range:	+200 to -400 daPa
Pressure delta:	300 daPa/sec
Measure time:	2 sec. for Compliance
Reflex tones:	500, 1000, 2000 and 4000 Hz at 85, 95 and 105 dB SPL
Reflex recognition:	automatically
Reflexes:	ipsi and contralateral
Pressurecalibration:	automatically at start
State indication:	LED 3-colours in probe, detailed display symbols
Changeover right/left:	automatic or manual

Ultrasound:

Method:	A-mode
Probe:	focussed, 10 mm diameter
Probe frequency:	3,5 MHz
Impuls frequency:	120 Hz
Probe power:	1,2 mW/cm ²
Total amplification:	80 dB
Depth amplification:	20 dB
Depth range:	Sinus frontalis - 3,5 cm; Sinus maxillaris - 7,5 cm
Depth amplification:	for maxillaris, for frontalis, for cysts, for small signals

Technical modifications possible

Combined diagnostic equipment

Center 4000-M UR (PC-based module)



Center 4000-M PC-module combines a perfect ENT-diagnostic and a modern design. Through the double function of rhinomanometry and ultrasound you save costs and space.

In the Rhino-Mode time saving adaptation via nose plugs allows a direct use at the doctors working-place, so the measurement fits within the normal examination. All calculation of flow, pressure, percentage and resistance coefficient is done in real time, so with completion of the measurement all results are present. Persons with beards, long hair and children with fear of masks, can be measured, too. For clinical use, a face-half-mask is available, too. During the measurement the intensity of breathing can be controlled via two measuring bars. The measurement is carried out anterior under physiological conditions of self-breathing and allows a quantitatively objective statement of the resistance behaviour of the nose.

The ultrasonic method is quick and easy to carry out, it is very user-friendly and completely without any dangerous side effects. It is specially used for progress reports of sinusitis patients. The measurement takes only a few seconds and is very reliable, no computer experience is required. The method of ultrasonic serves as a supplement or replacement of the x-ray, especially by its considerable inexpensive costs. In Germany in every ENT practice ultrasonic is used. For comparison, four sinus pictures can be stored. The depth amplification is stored in four curves that are able at the election. The linear amplification can be adjusted digital and linear. All data and measured curves are stored automatically at the harddisc of the computer. For printouts all Windows printers are available.

All calculation of flow, pressure, percentage and resistance coefficient are done in real time, so that with the end of the measurement the complete results are present. All functions, as well as curves and data are presented at the PC monitor. The results can be verified before documentation to avoid miss-printings. The data and measured curves can be stored at the PC or transmitted to a practice software.

Technical Details Center 4000-M UR:

System:	PC module with USB 2.0 interface
System requirements:	Pentium PC min. 500 MHz, USB 2.0 Port, Windows XP, 7, 8, 10 (32/64 Bit)
Dimensions:	330 x 120 x 265 mm (WxHxD)
Power supply:	13,2 V, external power supply 100-240 V, 50/60 Hz, 30 W
Accessories Rhinomanometer:	12 nose-plugs (olives), 2 flow-probes, 2 sets of hoses, foot pedal, probe holder, USB cable, power supply, installations-CD, manual
Optional Accessories:	face-half mask
Accessories Ultrasound:	Ultrasound probe, bottle sonogel, footswitch, probe holder, USB cable, installation-CD, power supply, manual

Rhinomanometer:

Method:	anterior self-breathing
Airflow:	0 - 900 ml /s in- and expiration
Pressure difference:	0-50 daPa
Function-control:	two measuring-bars in the display
Averaging:	max. 5 flow-curves
Pressure calibration::	automatic before start or manual
Visualization:	diagram and numeric values
Auto. calculation of:	pressure in daPa; flow in ml /sec incl. total-flow; percentage; resistance-coefficients; Point 2-5 at 75, 150 and 300 daPa
Application:	Proof of allergies after provocation; Diagnostics at handicapped nose breathing; Function control after nose operation; Control after dispensation of medicines

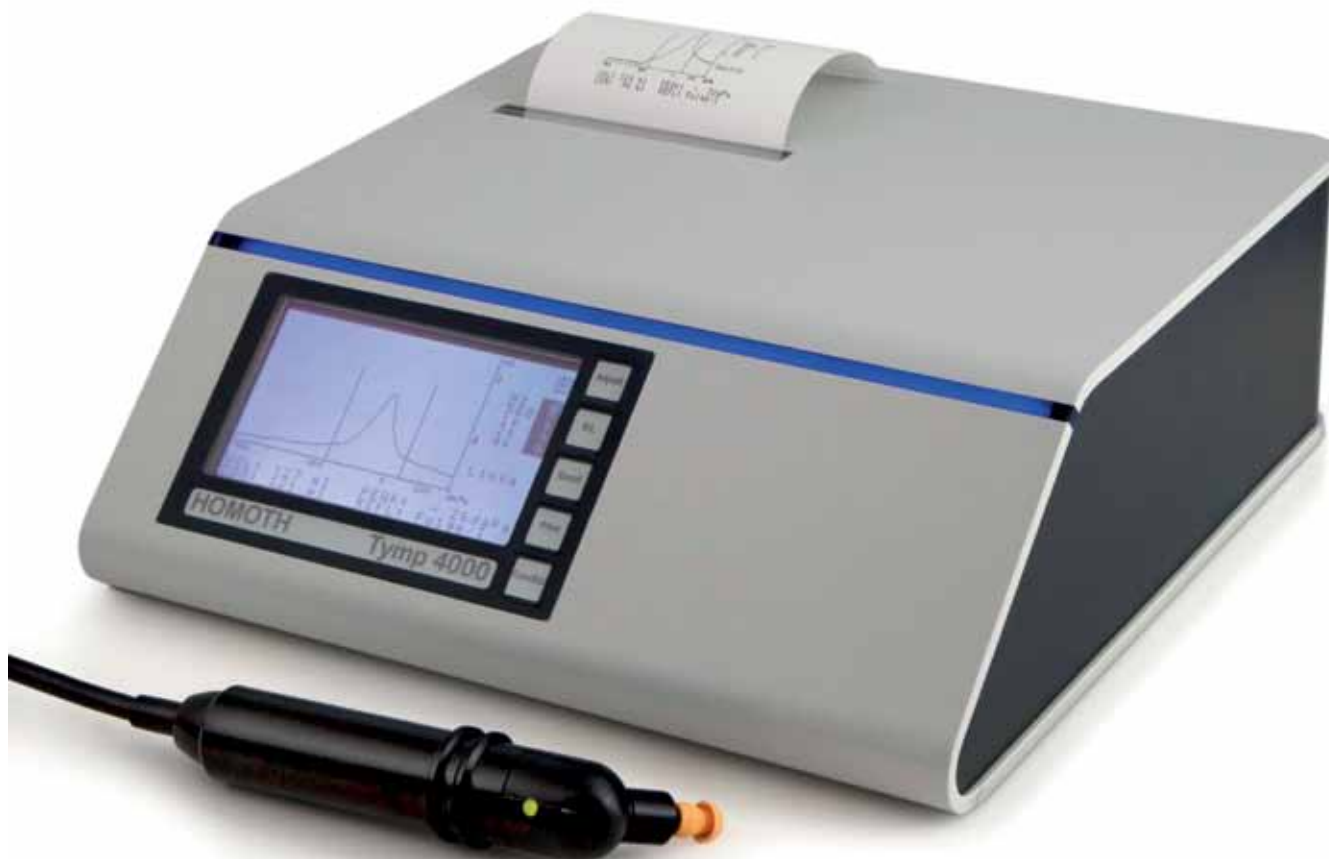
Ultrasound:

Method:	A-mode
Probe:	focussed, 10 mm diameter
Probe frequency:	3,5 MHz
Impuls frequency:	120 Hz
Probe power:	1,2 mW/cm ²
Total amplification:	80 dB
Depth amplification:	20 dB
Depth range:	Sinus frontalis - 3,5 cm; Sinus maxillaris - 7,5 cm
Depth amplification:	for maxillaris, for frontalis, for cysts, for small signals

Technical modifications possible

Middle Ear Diagnostic

Tympanometer Tymp 4000 (stand-alone device)



With the Tymp 4000 it is possible to do a full automatic impedance measurement within a few seconds. All functions, as well as curves and data are presented at a LCD-display. Herewith the results can be verified before documentation to avoid misprintings.

The device can be used in the doctors practice as well as in the clinic. Because the measurement of the compliance only takes two seconds, it is very suitable for children and restless patients. The test results are objective and independent from the assistance of the patient. Because of the extreme simple use, the examination can be done directly at the working place and fits in well in the general examination. Because of the test automatic a one-hand-operation is possible, so the head of the patient can be fixed with the other hand. For the measurement the probe is held against the outer ear. A two coloured lamp at the top of the handle indicates the correct fitting of the probe and the measurement is started automatically. It is possible to measure the stapedius reflex ipsi- and contralateral. During this measurement, the middle ear pressure is held in the outer ear canal

For printouts, an extreme fast digital printer, working very noiseless and economical is used. All data and diagrams can be stored on a hard disk if the device is connected to a PC-system (optional).

Technical Details:

System:	impedance- and reflex measurement
Probetone:	226 Hz, 85 dB SPL
Pressure range:	+200 to -400 daPa
Pressure delta:	300 daPa/sec
Measure time:	2 sec. for Compliance
Reflex tones:	500, 1000, 2000 and 4000 Hz at 85, 95 and 105 dB SPL
Reflex recognition:	automatically
Reflexes:	ipsi and contralateral
Pressurecalibration:	automatically at start
State indication:	LED 3-colours in probe, detailed display symbols
Monitor:	LCD Monitor with 240 x 128 Pixel
Integrated printer:	thermo printer with 112 mm paper width
Dimensions:	330 x 115 x 340 mm (WxHxD)
Power supply:	13,2 V, external power supply 100-240 V, 50/60 Hz, 35 W
Accessories:	probe with cable, 1 set ear plugs, headphone DD 45 C (option), probe holder, USB cable, power supply, installations-CD, manual

Technical modifications possible

Diagnostic

Rhinomanometer Rhino 4000 (stand-alone device)



With the Rhino 4000 a measuring method was evolved, which allows the adaptation via noseplugs and alternatively via face-mask. The method is used in the doctors practice as well as in clinics. All functions, data and diagrams are shown at a LCD display. Herewith the results can be verified before documentation to avoid miss-printings.

The time-saving adaptation via nose-plugs allows a direct use at the doctors working-place, so the measurement fits into the normal examination. All calculation of flow, pressure, percentage and resistance-coefficient are done in realtime, so by the end of the measurement the complete results are present. Persons with bearts, long hair and children with fear of masks, can be measured without any problems. For clinical use a face-half-mask is available. During the measurement the intensity of breathing can be controlled via two measuring bars. The measurement is carried out anterior under the physiological conditions of self-breathing and allows a quantitatively objective statement about the resistance-status of the nose.

Because of microprocessor controlling the use is very easy, so the measurement can be carried out by the medical personnel. The mean of max. five flow curves is calculated and shown in the diagram as flow-pressure curves. Also the flow-values for a difference-pressure of 75 Pa, 150 Pa and 300 Pa are calculated and shown in the screen, together with the percentage of right- and left-side flow. For clinical use the coefficient of the resistance is calculated.

For printouts, an extreme fast digital printer, woking very noiseless and economical is used. All data and diagrams can be stored on a hard disk if the device is connected to a PC-system (optional).

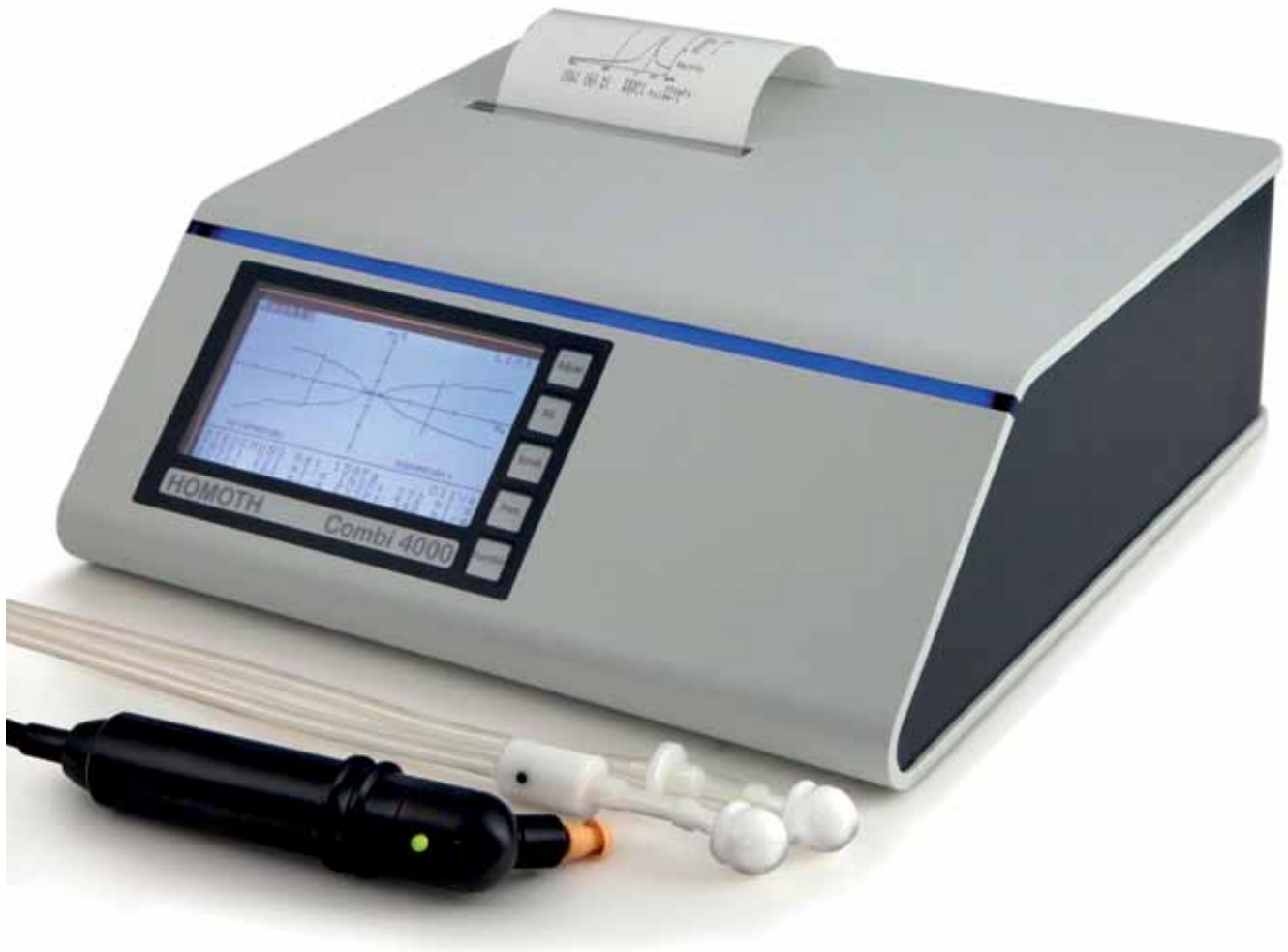
Technical Details:

Method:	anterior self-breathing
Airflow:	0 - 900 ml /s in- and expiration
Pressure difference:	0-50 daPa
Function control:	two measuring-bars in the display
Averaging:	max. 5 flow-curves
Pressure calibration:	automatic before start or manual
Visualization:	diagram and numeric values
Automatic calculation of:	<ul style="list-style-type: none">• pressure in daPa• flow in ml /sec incl. total-flow• percentage• resistance-coefficients• Point 2-5 at 75, 150 and 300 daPa
Display:	LCD Monitor with 240 x 128 Pixel
Printer:	thermo printer with 112 mm paper width
Dimensions:	330 x 115 x 340 mm (WxHxD)
Power supply:	13,2 V, external power supply 100-240 V, 50/60 Hz, 35 W
Accessories:	12 nose-plugs (olives), 2 flow-probes, 2 sets of hoses, foot pedal, probe holder, power supply, manual
Special accessories:	face-halfmask
Application:	<ul style="list-style-type: none">• Proof of allergies after provocation• Diagnostics at handicapped nose-breathing• Function control after nose operation• Control after dispensation of medicines

Technical modifications possible

Combined diagnostic equipment

Combi 4000 (stand-alone device)



Combi 4000 combines a perfect ENT-diagnostic and a modern design. Through the double function of tympanography and rhinomanometry you save costs and space.

With the Timp 4000 it is possible to do a fully automatic impedance measurement in a few seconds. The instrument is used in the doctors practice as well as in the clinic. The measurement of the compliance lasts only two seconds and is suitable thus excellent for children and restless patients. The test results are objective and independent from the assistance of the patient. Through the extreme simple use, the investigation can be made directly at the working place and fits in well in the general investigation. For the test the probe is held against the outer ear. A three coloured lamp at the handle indicates the correct seat of the probe and the measurement is started automatically. It is possible to measure the stapedius reflex ipsi- and contralateral. During this measurement, the middle ear pressure is held in the outer ear canal.

With the Rhino 4000 a measuring method was evolved that allows the adaptation via nose plugs and alternatively via a face mask. The method is used in the doctors practice as well as in clinics.

The time saving adaptation via nose plugs allows a direct use at the doctors working place, so that the measurement fits in the normal examination. For clinical use also a face-half-mask is available. The measurement is carried out anterior under the physiological conditions of self-breathing and allows a quantitatively objective statement about the resistance behaviour of the nose.

All calculation of flow, pressure, percentage and resistance coefficient are done in real time, so that with the end of the measurement the complete results are present. For printouts, an extreme fast digital printer, working very noiseless and economical is used. All data and diagrams can be stored on a hard disk if the device is connected to a PC-system (optional).

Technical Details Combi 4000:

Monitor:	LCD Monitor with 240 x 128 Pixel
Integrated printer:	thermo printer with 112 mm paper width
Dimensions:	330 x 115 x 340 mm (WxHxD)
Power supply:	13,2 V, external power supply 100-240 V, 50/60 Hz, 35 W
Accessories Rhinomanometer:	12 nose-plugs (olives), 2 flow-probes, 2 sets of hoses, foot pedal, probe holder, USB cable, power supply, installations-CD, manual
Special accessories:	face-halfmask
Accessories Tympanometer:	probe with cable, 1 set ear plugs, headphone DD 45 C (option), probe holder, USB cable, power supply, installations-CD, manual

Tympanometer:

System:	impedance- and reflex measurement
Probetone:	226 Hz, 85 dB SPL
Pressure range:	+200 to -400 daPa
Pressure delta:	300 daPa/sec
Measure time:	2 sec. for Compliance
Reflex tones:	500, 1000, 2000 and 4000 Hz at 85, 95 and 105 dB SPL
Reflex recognition:	automatically
Reflexes:	ipsi and contralateral
Pressurecalibration:	automatically at start
State indication:	LED 3-colours in probe, detailed display symbols
Changeover right/left:	automatic or manual

Rhinomanometer:

Method:	anterior self-breathing
Airflow:	0 - 900 ml /s in- and expiration
Pressure difference:	0-50 daPa
Function control:	two measuring-bars in the display
Averaging:	max. 5 flow-curves
Pressure calibration:	automatic before start or manual
Visualization:	diagram and numeric values
Automatic calculation of:	pressure in daPa; flow in ml /sec incl. total-flow; percentage; resistance-coefficients Point 2-5 at 75, 150 and 300 daPa
Application:	Proof of allergies after provocation; Diagnostics at handicapped nose-breathing; Function control after nose operation; Control after dispensation of medicines

Technical modifications possible

Objective Audiometry

TE-OAE 4000 (PC-based module)



TE-OAE 4000 PC module trends new paths in evaluating results of measured Otoacoustic Emissions. All measured data is classified according to signalstatistic and signaldynamic features. The result is transmitted to an expert system as parameter vectors. The expert system, containing more than 10.000 evaluated OAE measurements, compares all parameter vectors with the stored samples. All data and measured curves can be stored on harddisc, if the device is connectet to a PC. For printouts, an extremely fast digital-printer, working very noiseless and economical is used.

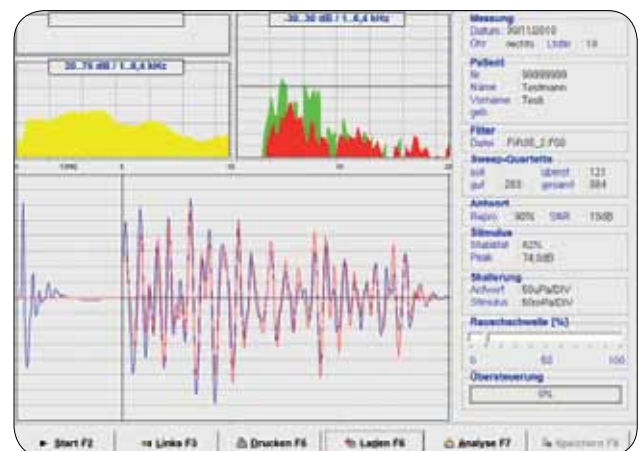
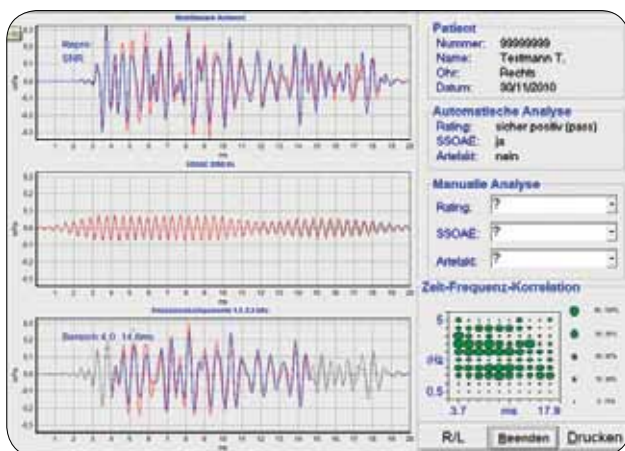
The analysis module consists of an artificial neuronal network, supplemented by modern fuzzy logic. The result is transmitted to the personal computer, via USB port, and is presented on the monitor. Using the expert system an objective result of a hearing test, comparable to subjective evaluation of an experienced OAE expert, is possible. The actual measured data is compared and evaluated automatically within a few seconds. So everybody is able to use the special knowledge of many OAE experts. The analysis module evaluates the signalstatisticand the signaldynamic parameters, the artefacts are eleminated and the characteristic components of the emissions are isolated. The screen shows the SOAE, TE-OAE and the artefacts.

Therefore the expert system also allows the untrained user of the OAE system, a very high safety regarding the statement of result. As for a classical OAE measurement, all relevant diagrams are displayed at the monitor. The TE-OAE expert connects all advantages of the classical OAE diagnostic with the most modern computer technology as neuronal networks and fuzzy logic.

Technical Details:

System:	PC- Module
System requirements:	Pentium PC min. 800 MHz, USB 2.0 Port, Windows XP, 7, 8, 10 (32/64 Bit)
Stimulus:	clickquartett (3 pos. / 1 neg.) 20 ms rate
Results presentation:	time window with two correlating measurements in different colour, time window with the spontaneous emissions, maxima of the emissions, realtime spectrum of the stimulus, spectrum of the emissions / spectrum of the noise , ZF correlation F/t parameter for SNR, stability, reproduction numbers of the artefacts and the given stimuli automatical analysis of the results after the expert system (certain positiv, positiv, poor positiv, negativ, certain negativ)
Intensity:	approx. 80 dB with automatical gain control
Probe:	<ul style="list-style-type: none"> • miniature design with pressure ventilation • realtime probe control via FFT
Converter:	12 Bit / 100 kHz
Amplifier:	80 dB with automatical gain setting
Measurement:	manual adjustable 16,32,64,128,256,512 clickquartetts
Artefacts:	automatical artefact recognition and elimination
Power supply:	13,2 V, external power supply 100-240 V, 50/60 Hz, 15 W
Probe cable:	2000 mm, high flexible with a patients clip for fastening
Dimensions:	330 x 80 x 265 mm (WxHxD)
Weight:	2,1 kg
Accessories:	1 miniature probe, complete with 24 ear plugs in 6 different sizes, USB-cable, power supply, installations-CD, manual

Technical modifications possible



Objective Audiometry

DP-OAE 4000 (PC-based module)



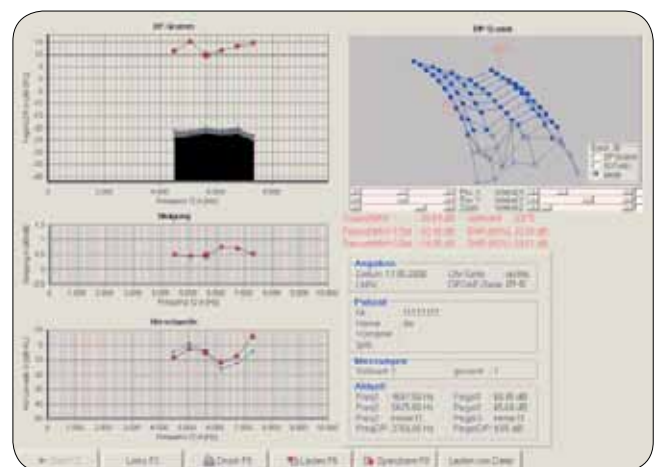
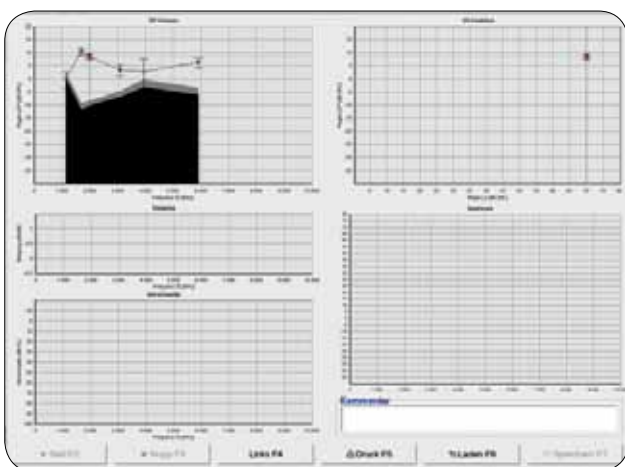
Lately the Otoacoustic Emissions (OAE) have become more and more important in the field of objective diagnosis at sensorineural deafness. Using the TE-OAE measurement (Transient Evoked Otoacoustic Emissions) clicks will cause a wide-band-irritation, using the DP-OAE's specific frequencies for irritation, (Distorsion-Products Otoacoustic Emissions) it is possible to provoke, measure and evaluate frequency related parts of the cochlear. A sound proof cabin is not necessary, only a noise-reduced area. By continuous stimulation with two presetable primary sinus tones (f_1 , f_2), the selected area of the cochlea is provoked. The DP-OAE method increasingly rises in clinical means. This unproblematic and quick measurement is suitable for all age groups. Especially as a precaution-examination for children and newborns this method is established worldwide. In this occasion, already a low distinctive hearing-loss, at the begin of a deafness, can be recognized. From screening measurements in the paediatrics using 4 frequency-areas up to clinical examinations containing 10 frequency-areas, the DP-OAE 4000 covers the entire spectrum of test demands of regular DP OAE measurements. The two measure-requirements $DP\ 1 = 2F_1 - F_2$ or $DP\ 2 = 2F_2 - F_1$ and averaging in time or in spectral area, makes this device suitable to a wide range of diagnostic.

In addition, the DP-OAE offers a "Hearingloss-Mode". Using this mode, a predefined (By doctor or audiologist) number of frequencies is tested by decreasing the input of SPL. The SPL range lasts from 70 dB to 0,5 dB splitted into 0,5 dB steps. Using an algorithm, the DP-OAE software is able to determine the hearingloss. This method is very helpful in cases a "real" tone-audio can not be realized. Ensuring the optimal positioning of the probe, a "best-fit-test" is integrated. A volume measurement is testing probe-stability during the complete measurement. In order to make measurements more reliable, two additional methods of suppressing artefacts and unwanted responses are used. First, a third frequency (f_3 , suppressor tone) can be added in order to avoid finestructure of the response and work out the distortion products with very high quality. Second, the output is set into a phase-relation to the inputsignal. Doing this, steady occurring artefacts will be spotted, specially marked and taken out of the evaluation. The results of the diagnostics are displayed within the following graphics: DP-Diagram, Input/Output-Funktion, Slope, Hearing-Loss-Diagram. A special 3-D graphic allows to see all evaluated curves in one diagram, which can be turned into all directions for easy analysis. All data is stored on harddisc of the computer. Other diagnostic-moduls can be connected to the computer and use the same patients datafiles.

Technical Details:

System:	PC module with USB 2.0 interface
System requirements:	Pentium PC min. 500 MHz, USB 2.0 Port, Windows XP, 7, 8, 10 (32/64 Bit)
Stimulus:	562 Hz to 9.843 kHz
Test-Range:	500 - 8.000 Hz
Intensity:	0,5 dB SPL to 70 dB SPL choosable in 0.5 dB steps level differences free selectable
Probe:	miniature design with pressure ventilation and half autom. self-cleaning
Probe control:	with best-fit-test and realtime control view of stimulus and spectrum
Averaging:	all sweeps can be averaged in time or spectral area
Results-presentation:	DP-graph with signal, noise, and the corresponding spectrum input / output function - slope - hearing loss in HPL alternatively evaluation of DP 1 = 2F1 - F2 or DP 2 = 2F2 - F1
Probe cable:	2000 mm, flexible with fastening clip
Power supply:	13,2 V, external power supply 100-240 V, 50/60 Hz, 15 W
Wandler:	16 Bit / 48 kHz
Dimensions:	330 x 80 x 265 mm (WxHxD)
Weight:	2,1 kg
Accessories:	1 miniature probe complete 30 earplugs in 5 different sizes, USB-cable, power supply, installations-CD, manual

Technical modifications possible



Brainstem Audiometry

BERA 4000 (PC-based module)



BERA 4000 PC-module is a real time brainstem audiometer. It is developed considering the latest knowledge of the ENT research.

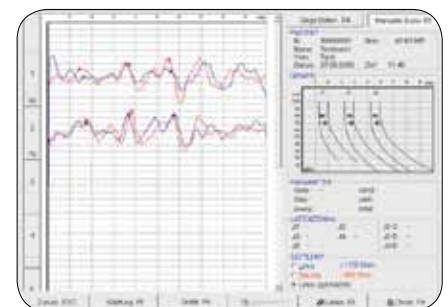
By use of most modern processors, a wide range of possibilities is opened. It is a system lasting into the future for a lot of years, because all changes in diagnostic demands can be loaded as an update or upgrade via software into the system. The software contains pre-selected standard programs, to reduce the operation of the system onto a few keymoves. Beside this, it is possible to create storable measuring programs with individual parameter selections.

Further more, the EXPERT-MODE allows to create and change settings during measurement sessions and adapt to changing situations or patients condition. 16 curves can be measured per examination and stored into a temporary memory. The evaluation / analysis can be done afterwards at a later time. All curves are presented high resolution at the colour screen of PC. The program is menu controlled and fitted with a online help.

Technical Details:

System:	PC module with USB 2.0 interface
System requirements:	Pentium PC min. 500 MHz, USB 2.0 Port, Windows XP, 7, 8, 10 (32/64 Bit)
Stimulus:	Klick 50 - 500 μ s
Polarity:	positive, negative and alternating
Rate:	1 - 50 per sec in 0,1 steps
Masking:	0 - 80 dB white noise
Measurement	1 channel (ipsi / contra) EEG amplifier 80 dB / input imp. > 48 MOhm, automatic or manual gain selection
Averager:	max. 10.000 Sweeps
Analysis time:	10 ms (fast potentials)
Artefacts:	real-time elimination (time and amplitude)
Filter:	<ul style="list-style-type: none"> • 1. highpass 100 - 150 - 200 - 300 Hz • 2. lowpass 1 - 2 - 3 - 8 kHz • 3. software filters • 4. 50 Hz notch filter
Results:	<ul style="list-style-type: none"> • 1. curve diagrams 8x right und 8x left • 2. latency diagram • 3. direct comparison right / left
Cable length:	275 cm + 60 cm electrodes cable
Power supply:	13,2 V, external power supply 100-240 V, 50/60 Hz, 15 W
Dimensions:	330 x 80 x 265 mm (WxHxD)
Weight:	2,1 kg
Accessories:	headphone DD 45, measure cable with 3 electrode clamps, red - yellow - black, set standard electrodes (50 pieces), USB cable, Software-CD, power supply, manual

Technical modifications possible



Vestibular Diagnostic

ENG 4000 (PC-based module)



The ENG 4000 2-Channels module corresponds with all requirements of the modern vestibularis diagnostic. It is designed considering the latest knowledge of computer technology. The operation menu controlled completely, so the use is very easy, especially for untrained medical staff.

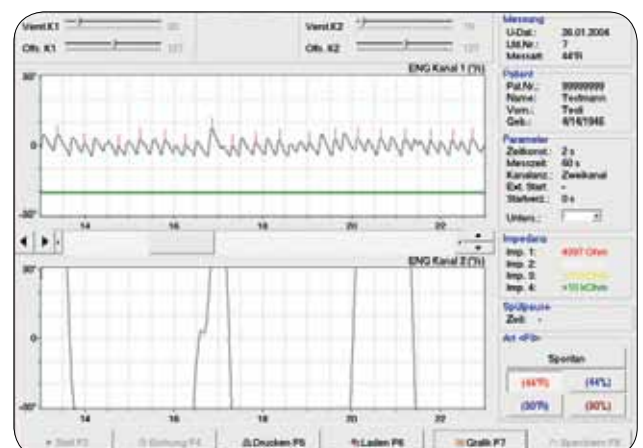
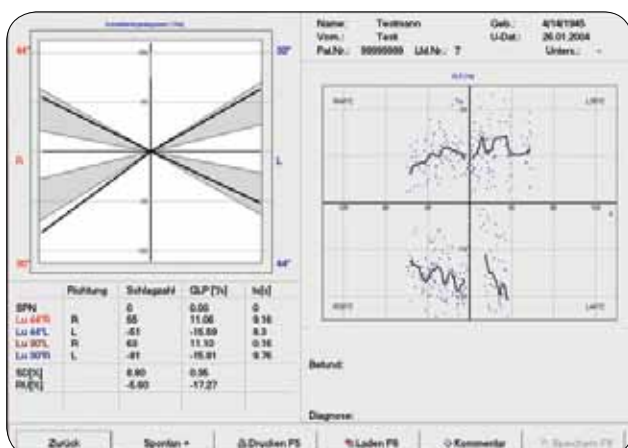
The calibration includes the individual adaptation of the patient to the measuring system, it will be completely done by the computer. The real time measurement allows watching the entire progress on monitor online. The evaluation is automatically done by the computer, a manual evaluation or correction can be switched on, if required.

The fade-in of standard areas within the butterfly diagram allows a quick assignment of the Measurement results. All the results can be stored space saving on harddisk using a D-base similar format. The comfortable EDP-connection allows a quick and trouble-free transfer of data to a central EDP system. Measurement results as well as all curves and data can be printed out for documentation or for patient referrals.

Technical Details:

System:	PC module with USB 2.0 interface
System requirements:	Pentium PC min. 800 MHz, USB 2.0 Port, Windows XP, 7, 8, 10 (32/64 Bit)
Method:	<ul style="list-style-type: none"> • 2 channel measuring with real time recording • Horizontal and vertical • 1. calibration • 2. spontaneous nystagmus • 3. caloric test • 4. individual tests
Time constants:	selectable, DC 0,2 sec, 2 sec, 5 sec
Upper frequency limit:	30 Hz
Amplification:	80 dB
Common rejection.:	> 100 dB
Scanrate per channel:	100 Hz
Calibration:	with automatic electro-optic via calibration bar
Evaluation:	<ul style="list-style-type: none"> • selectable - manual or automatic - with individual correction possibility • 1. nystagmus numbers • 2. magnifying function for small nystagmen • 3. butterfly diagram • 4. evaluation of the velocity of the slow phase
Result presentation:	<ul style="list-style-type: none"> • 1. nystagmus-curves at a max. length of 3 min. • 2. magnifying function for small nystagmen • 3. butterfly diagram • 4. in table-form
Power supply:	13,2 V, external power supply 100-240 V, 50/60 Hz, 15 W
Dimensions:	330 x 80 x 265 mm (WxHxD)
Weight:	2,1 kg
Accessories:	measure cable with 5 clamps, bag standard electrodes 50 pc., set cables, calibration bar with stand, USB cable, installation-CD, power supply, manual

Technical modifications possible



Vestibular Diagnostic

ENG 4000plus (PC-based module)



ENG 4000plus module combines a perfect ENT-diagnostic and a modern design. Through the double function of 2-channel ENG and air calorimeter you save costs and space.

The ENG 4000 + 2-Channels module corresponds with all requirements of the modern vestibular diagnostic. It is designed considering the latest knowledge of computer technology. The operation menu controlled completely, so the use is very easy, especially for untrained medical staff.

The calibration includes the individual adaptation of the patient to the measuring system, it will be completely done by the computer. The real time measurement allows watching the entire progress on monitor online. The evaluation is automatically done by the computer, a manual evaluation or correction can be switched on, if required. The fade-in of standard areas within the butterfly diagram allows a quick assignment of the Measurement results. All the results can be stored space saving on harddisk using a D-base similar format. The comfortable EDP-connection allows a quick and trouble-free transfer of data to a central EDP system. Measurement results as well as all curves and data can be printed out for documentation or for patient referrals

Due to the easy feasibility of caloric stimulation by air it has won more and more recognition. Compared to the medium water, the air has the advantage that after rinsing there is no need to collect the medium in any way. A water connection or outflow is unnecessary. Another crucial advantage is, that it is possible to stimulate calorically perforated eardrums also. Another advantage is the possibility to be able to flush in any position of the patient. With a removable ear-joining piece made of skin friendly rubber a targeted air flow is brought into the external auditory canal. By special formability can be avoided.

Technical Details ENG 4000plus:

System:	PC module with USB 2.0 interface
System requirements:	Pentium PC min. 800 MHz, USB 2.0 Port, Windows XP, 7, 8, 10 (32/64 Bit)
Dimensions:	330 x 120 x 265 mm (WxHxD)
Power supply:	13,2 V, external power supply 100-240 V, 50/60 Hz, 30 W
Standards:	EN 60601-1/ 1-1/ 1-2
Accessories ENG:	measure cable with 5 clamps, bag standard electrodes 50pc., set cables, calibration bar with stand, USB cable, installation-CD, power supply, manual
Accessories air calorisor:	probe holder, silicone adapter (25 pcs.), power supply, manual

Air calorisor:

Method:	caloric testing with warm/cold air
Temperature range:	+25° C to +47° C (depending on room temperature)
Timer:	in 5 sec. steps
Flow:	5.000 to 10.000 ccm/min, adjustable
Ready-to-use time:	24 sec. to +47° C

ENG 4000:

Method:	<ul style="list-style-type: none">• 2 channel measuring with real time recording• Horizontal and vertical• 1. calibration• 2. spontaneous nystagmus• 3. caloric test• 4. individual tests
Time constants:	selectable, DC 0,2 sec, 2 sec, 5 sec
Upper frequency limit:	30 Hz
Amplification:	80 dB
Common rejection.:	> 100 dB
Scanrate per channel:	100 Hz
Calibration:	with automatic electro-optic via calibration bar
Evaluation:	<ul style="list-style-type: none">• selectable - manual or automatic - with individual correction possibility• 1. nystagmus numbers• 2. magnifying function for small nystagmen• 3. butterfly diagram• 4. evaluation of the velocity of the slow phase
Result presentation:	<ul style="list-style-type: none">• 1. nystagmus-curves at a max. lenght of 3 min.• 2. magnifying function for small nystagmen• 3. butterfly diagram• 4. in table-form

Technical modifications possible

Vestibular Diagnostic

Air calorimator (stand-alone device)



Due to the easy feasibility of caloric stimulation by air it has won more and more recognition. Compared to the medium water, the air has the advantage that after rinsing there is no need to collect the medium in any way. A water connection or outflow is unnecessary.

Another crucial advantage is, that it is possible to stimulate calorically perforated eardrums also. Another advantage is the possibility to be able to flush in any position of the patient. With a removable ear-joining piece made of skin friendly rubber a targeted air flow is brought into the external auditory canal. By special formability pitot heating up, violation of the ear canal can be avoided.

Technical Details:

Control:	Single-Chip Microprocessor
Display:	LC-Display
Method:	caloric testing with warm/cold air
Temperature range:	+25° C to +47° C (depending on room temperature)
Resolution:	0,1 °C
Pump:	silent pump
Timer:	in 5 sec. steps
Flow:	5.000 to 10.000 ccm/min, adjustable
Ready-to-use time:	24 sec. to +47° C
Dimensions:	330 x 115 x 340 mm (WxHxD)
Weight:	3 kg
Power supply:	13,2 V, external power supply 100-240 V, 50/60 Hz, 35 W
Accessories:	probe holder, silicone adapter (25 pcs.), power supply, manual

Technical modifications possible



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