

SD-X (SD-XM)

Senso Diva 100% digital ITE/ITC

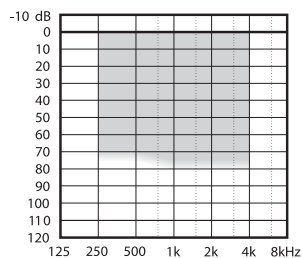
- Sensogram
- Diva Compression
- Diva Noise Reduction with Speech Intensification
- Diva Locator
- Diva Feedback Cancelling
- Diva Occlusion Manager



Recommended for:

- Mild and moderate-to-severe losses
- Flat, sloping, ski-slope and reverse slope losses
- Cookie-bite losses

Suggested Fitting Range



Senso Diva ITCs offer cutting edge technology and the most advanced audiological solutions in a very attractive package.

- 2MHz/1bit sigma-delta converters
- 32 kHz/20 bit processing
- Sensogram in 4 or 14 bands as required
- Enhanced Dynamic Range Compression in 15 channels, Sound Stabilizer and Anti Smearing System
- Diva Noise Reduction with Speech Intensification in 15 channels
- Diva Locator is a new dual microphone system with Adaptive Beamforming, OptiMic system with adaptive matching and Noise Classification
- Diva Feedback Cancelling with Feedback Path Simulator and Dynamic Cancellation Optimiser
- Diva Occlusion Manager with fine tuning of own voice perception
- Beep-tone indicator for programme selection and low battery
- Easy programming with NOAH/Compass or the SP3 dedicated programmer
- Choice between listening programmes: M, MT, T (and Music for SD-XM)
- Optional volume control

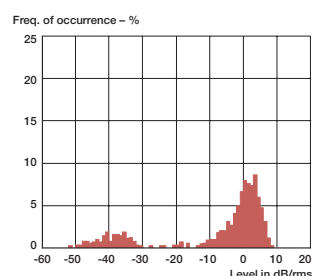
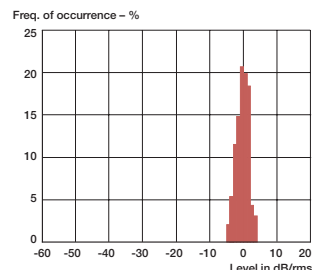
Sensogram

The Sensogram is one of the most efficient and precise fitting methods available. By measuring the hearing threshold of the patient, with the hearing aid properly positioned in the ear, large variations are eliminated compared to traditional audiogram based fittings. The basic Sensogram is performed at 500 Hz, 1 kHz, 2 kHz and 4 kHz. The test signals used are frequency modulated pulses with the maximum frequency deviation automatically set to the critical bandwidth, corresponding to the centre frequency of each band.

Diva Compression

Senso Diva has an EDRC system implemented in 15 channels. The best possible frequency response for speech perception is obtained by using a loudness equalisation principle for speech level inputs. Louder and weaker sounds are amplified according to the loudness normalisation principle to restore normal loudness perception over the frequency range. Consequently weak sounds will be perceived as weak, yet audible, and loud sounds will be perceived as loud, yet not uncomfortable to the user. This leads to multi-segmental I/O curves, which include the use of Low Level Compression (LLC) and High Level Compression (HLC), providing separate control over sound reproduction at low and high input levels in all channels. EDRC also includes the use of low compression kneepoints, well below 20 dB HL. Fine tuning is done through individual gain adjustment for soft, normal (speech) and loud level inputs in each basic band. A Sound Stabilizer and an Anti Smearing System have been implemented in each of the 15 channels. Combined, this ensures a steady gain in stable environments and fast adaptation to changes in the acoustic environment, while at the same time preserving temporal and spectral contrasts of the speech signal.

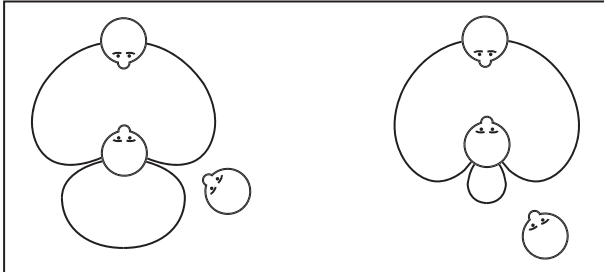
Diva Noise Reduction with Speech Intensification



Diva Noise Reduction with Speech Intensification relies on a statistical analysis of the incoming signal and distinguishes speech from background noise by monitoring the distribution of short-term intensity levels in 15 channels. The narrow filter bandwidths enable a very effective noise reduction. The Speech Intensification System is an integral part of the Diva Noise Reduction algorithm which receives information from all 15 channels and adjusts the amplification in a way that will enhance speech in noisy situations.

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Diva Locator



Diva Locator is an Adaptive Beamforming system which estimates the location of noise sources and focuses on attenuating these sources. The optimum microphone characteristic is adaptively controlled and continuously changes its polar pattern from omnidirectional over cardioid, supercardioid, hypercardioid to bidirectional. The Noise Classification analyses the incoming sound and continuously adjusts the degree of beamforming best suited for the particular situation. In some noise types, such as wind noise, the hearing instrument user will benefit from omnidirectional mode, and in such cases the beamforming smoothly adjusts to omnidirectional mode. Diva Locator uses a dual microphone and includes continuous matching of the microphones in both phase and amplitude, thus effectively eliminating the problems related to microphone mismatch and maintaining good directional performance over time, even in the low frequencies.

Diva Feedback Cancelling

Senso Diva has a dynamic feedback cancellation system. The system adaptively imitates the signal feeding back from the receiver, by way of a Feedback Path Simulator. The imitated signal is subtracted from the incoming signal, thus eliminating the feedback. The Dynamic Cancellation Optimiser monitors the function of the Feedback Path Simulator and reduces amplification in the relevant channel if quickly changing conditions occur. As soon as the acoustic situation becomes stable, the Feedback Path Simulator adapts to the new situation. The system parameters are initialised by a feedback test at the time of fitting.

Diva Occlusion Manager

Diva Occlusion Manager is a tool for managing the perception of occlusion that is experienced by many hearing aid users. By fine tuning the compression characteristics and high input level gain in the low frequency area, the amplification of the user's own voice can be controlled. Audibility and good sound quality is maintained and at the same time the negative effects of occlusion of the ear canal are systematically minimised.

Listening Programmes

The traditional three listening programmes M-MT-T have been supplemented with a music programme. The Music programme is a pre-programmed option derived from the original fitting with all signal processing parameters optimised for listening to music.



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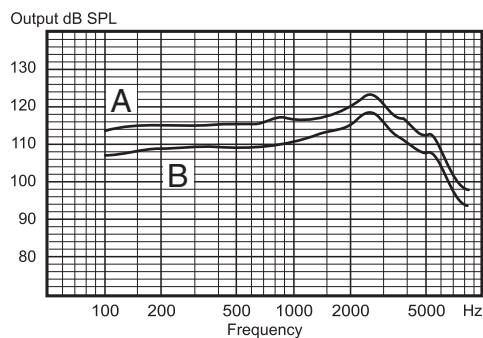
Technical Data

	711 Ear simulator	2cc Coupler
OSPL90: Peak	123 dB SPL	113 dB SPL
1 kHz	116 dB SPL	109 dB SPL
HAIC	117 dB SPL	110 dB SPL
Battery Drain (st.by)	1.15 mA	
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Battery Type 312 Zn-Air (145 mAh)	125 hours	
Telecoil TLS*	+ 2 dB	
Harmonic Distortion	1%	
IRIL (GSM/DCS interference level)	5/15 dB SPL	

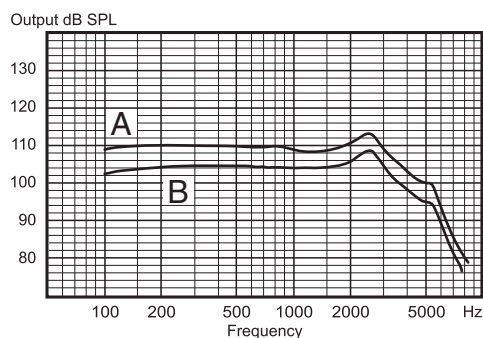
* A telecoil input of 100 mA/m will equal a microphone input of 70 dB SPL.

AOC (Automatic Output Control) is an output limiting compression circuit that eliminates distortion from saturation. It can be turned on (=factory setting) and off from the programming devices.

Maximum output (ear simulator - IEC711)



Maximum output (2cc coupler - IEC126)



Sampling rate	32 kHz
Max word length	32 bits
A/D Converters	2MHz/1bit sigma-delta
DDD stage	1MHz/1bit sigma-delta
System delay	<2 msec
Processor type	Dedicated ASIC
Frequency bands	15 in 1/3 octaves
Channels	15

