

Senso Diva élan 100% digital open fit BTE

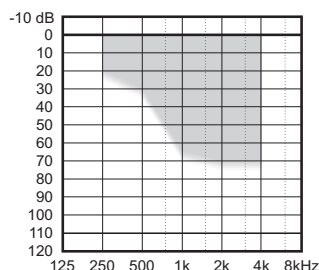
- Sensogram
- Sound Harmony™
- Diva Compression
- Diva Noise Reduction with Speech Intensification
- Diva Locator
- Diva Feedback Cancelling
- 4 listening programs
- Instant fitting with élan ear-set



Recommended for:

- Mild to moderate hearing loss
- High frequency hearing loss

Suggested Fitting Range:



Senso Diva élan offers 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 fitting in 4 to 11 bands as required
- Sound Harmony – a unique signal processing method to harmonise the effect of the amplified sound and the direct sound in the ear canal. This ensures adequate gain and good sound quality
- Individual compression in all channels, Sound Stabilizer and Anti Smearing System
- Diva Noise Reduction with Speech Intensification
- Diva Locator, a dual microphone system with Adaptive Beam-forming, OptiMic system with adaptive matching and Noise Classification
- Diva Feedback Cancelling with Feedback Path Simulator and Dynamic Cancellation Optimiser
- Beep-tone indicator for program selection and low battery
- Easy programming with NOAH/Compass or the SP3 dedicated programmer
- Choice between listening programs: M, MT, T and Music
- Optional volume control
- The élan open fit ear-set provides maximum comfort through a high degree of individualisation and discretion
- Custom élan - CAMISHA compatible

Sensogram

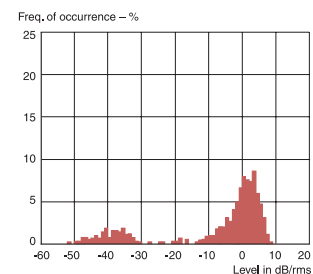
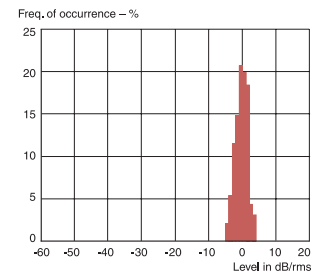
The Sensogram is one of the most efficient and precise fitting methods available. By measuring the hearing threshold of the patient with the selected élan ear-set in place, large variations are eliminated compared to traditional audiogram based fittings. The basic Sensogram is performed at 500 Hz, 1 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 élan has an EDRC system implemented. 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. A Sound Stabilizer and an Anti Smearing System have been implemented. 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.

EDRC is applied in the mid and high frequencies to compensate for hearing loss and recruitment. In the low frequencies the hearing aid user is listening to the direct sound through the open fit élan ear-set.

Diva Noise Reduction with Speech Intensification



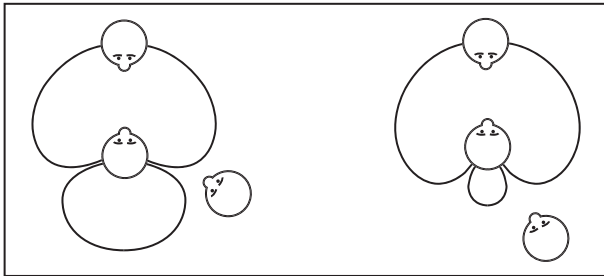
Diva Noise Reduction with Speech Intensification relies on a statistical analysis of the incoming signal and distinguishes speech from background noise by monitoring the distribution of short-term intensity levels. The narrow filter bandwidths enable a very effective noise reduction. The Speech Intensification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

Diva Feedback Cancelling

Senso Diva élan 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.

SD-9Mé

Diva Locator



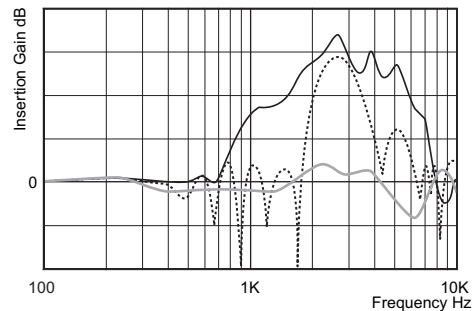
Diva Locator is an Adaptive Beamforming system which estimates the location of noise sources and focuses on attenuating these sources. The optimum microphone characteristic is adaptively controlled and continuously changes its polar pattern from omnidirectional over cardioid, supercardioid, hypercardioid 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.

Listening Programs

Senso Diva élan has two default listening programs, which the program button can switch between. "M" turns on the microphone and is intended for general use. "Mus" is a pre-programmed option derived from the original fitting with all signal processing parameters optimised for listening to music.

The two default programs can be supplemented with two traditional programs. "M+T" allows listening to the combined input of telecoil and microphone (Diva Locator disabled) and "T" is for telecoil. This provides the hearing aid user with up to four listening programs if needed.

Sound Harmony™



Sound Harmony is a signal processing method designed to address the various issues that are a consequence of an open fitting. An open fitting will result in some of the amplified sound filtering out of the ear canal, resulting in a lower sound pressure level at the eardrum. Consequently, extra amplification is required. Also, the hearing aid must compensate for a different ear canal resonance dictated by the open fitting (grey curve in illustration) and not the traditional closed ear canal resonance. Another issue is the combination of direct and amplified sound. If these are added out of phase, dips will be seen on the frequency response (dotted curve) and the perceived sound quality deteriorates.

Sound Harmony is designed to compensate for all of these effects (black curve), by ensuring that adequate amplification and good sound quality are realized in the open fitting.

The élan open fit ear-set

The élan ear-set is a combination of unique elements designed especially for élan instruments to deliver the sound from the hearing aid into the user's ear as comfortably and discreetly as possible. The ear-set consists of an integrated earhook and sound tube available in three lengths, a small, soft é-tip, available in four sizes to keep the sound tube comfortably in position without plugging the ear canal, and a flexible anchor to keep the élan ear set and the é-tip securely in place.

Senso Diva élan signal processing is designed specifically for use with the élan ear-set.



SD-9Mé

Technical data

	IEC 711 Ear simulator	IEC 126 2cc coupler
OSPL90 Peak	115 dB SPL	105 dB SPL
1 kHz	103 dB SPL	95 dB SPL
HAIC	102 dB SPL	95 dB SPL
Harmonic distortion	2.1 %	1.8 %
Battery drain (st.by)	1.15 mA	
Battery drain	1.2 mA	
Battery type 13 Zn-Air (270 mAh)	225 hours	
Telecoil TLS *	+2 dB	
IRIL (GSM/DCS interference level)	5/15 dB SPL	

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

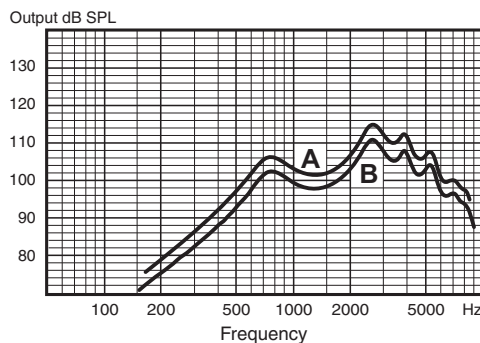
Processing data

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

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.

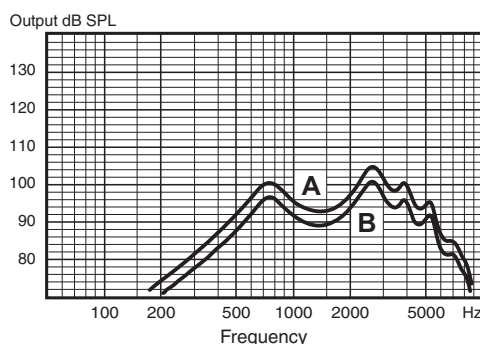
MPO data has been measured to reflect the SD-9Mé output alone. In real life it will be mixed with direct sound through the ear canal. Measured through a normal hook and a sealed coupler, the curves will have yet a different shape.

Maximum output (Ear simulator - IEC711)



A: AOC disabled B: AOC enabled

Maximum output (2cc coupler - IEC126)



A: AOC disabled B: AOC enabled

