

Measure at the speed of light ...

LENSTAR LS 900®



Biometry

 **HAAG-STREIT  
INTERNATIONAL**  
Precision by Tradition

# Explore new dimensions ...

- Complete optical biometry – including CCT and lens thickness
- Align once, get all results – fastest biometrical assessment
- Noncontact, highest precision – all measures on the true optical axis



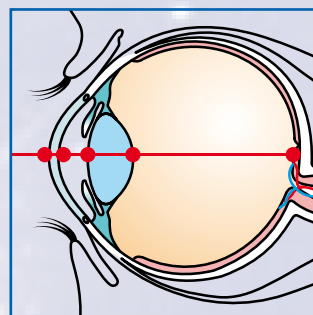
# The first optical biometry of the entire eye ...



## **EIGHT MEASUREMENTS IN ONE SHOT**

Precise measurement of eye parameters is critical in modern cataract treatment.

The LENSTAR LS 900 provides the surgeon with all necessary parameters needed to calculate the optimal IOL using latest multivariable formulas in one single measurement. The measurement includes corneal thickness, anterior chamber depth, lens thickness, axial length, keratometry, white to white distance, pupilometry and eccentricity of the optical axis.



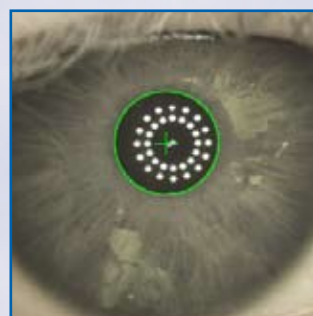
## **FAST AND PATIENT FRIENDLY MEASUREMENTS**

The measurement process of the LENSTAR LS 900 is optimised to ensure maximum patient comfort and minimum process time. The device has to be aligned only once to get all measurements in a single shot. Blinking of the patient is detected and only good measurements are taken for the analysis.



## **PRECISION ON THE TRUE VISUAL AXIS**

The patient fixates directly on the measurement beam. This ensures that all readings are taken on the true optical axis. Furthermore all length measurement are assessed with optical coherence biometry, leading to unmatched precision and accuracy. Multiple markers ensure a stable and reliable measurement of the corneal curvature.



# The future begins now ...

## The all in one optical biometer

Optical coherence biometry revolutionised cataract surgery, the LENSTAR LS 900 is about to revolutionise optical biometry. State of the arte, multivariable IOL calculation formulas demand more than just the axial length and keratometry values of the eye. LENSTAR LS 900 provides the user with a complete biometrical assessment of the patient's eye in a single measurement procedure, including lens thickness, anterior chamber depth (lens position) and central corneal thickness.

### CENTRAL CORNEAL THICKNESS (CCT)

CCT is measured using optical coherence technology, leading to unmatched accuracy and precision. Reproducibility of this measurement is as good as  $\pm 2\mu\text{m}$ , providing one of the base parameters for possible laser correction of the cataract surgery.

### KERATOMETRY

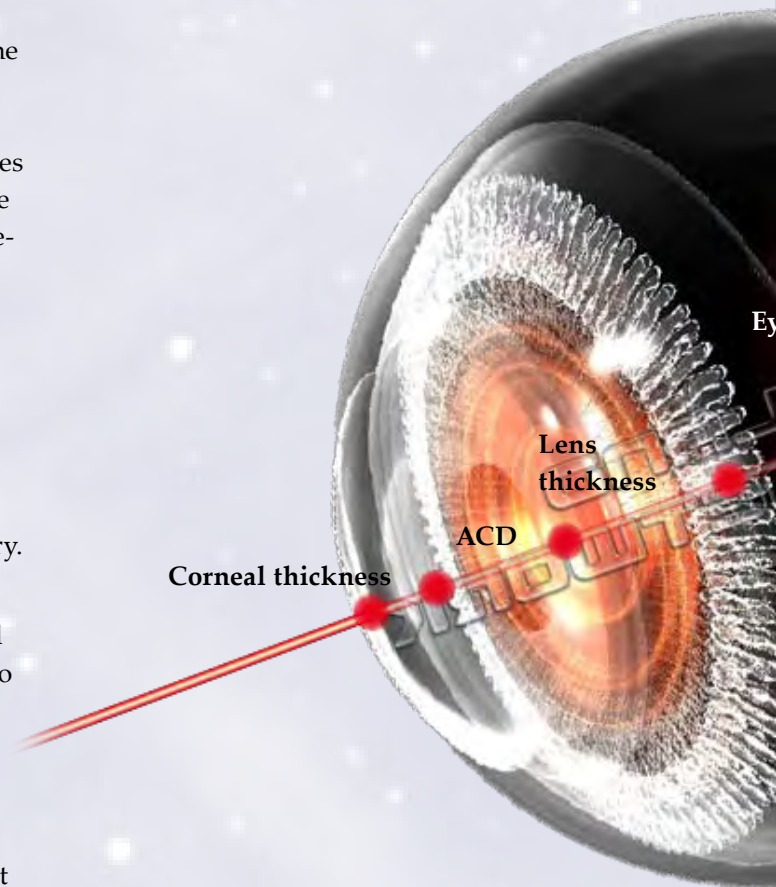
A 32 marker pattern ensures precise assessment of the corneal curvature of the patient. The distribution of the marker on two concentric circles allows stable measurements even with non-compliant patients.

### PUPILLOMETRY

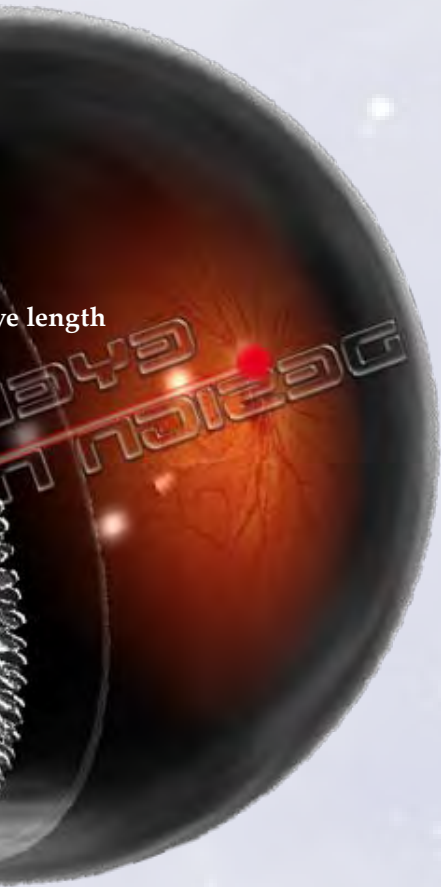
The software allows the measurement of the patient's pupil diameter in ambient light condition. Adjusting respective light levels allows to assess the patient's adaptation capabilities.

### WHITE TO WHITE

For sulcus fixated IOLs and for the calculation of the IOL power using Holliday II formula, LENSTAR SL 900 measures white to white distance (horizontal Iris width).



# Unlimited optical biometry ...



## LENS THICKNESS

Modern multivariable IOL calculation formulas use the patient's lens thickness as an input parameter. LENSTAR LS 900 provides the user with the measurement of true lens thickness on the optical axis of the patient using optical coherence technology. No more estimation or additional ultrasound based measurement, to get this important parameter.

## ANTERIOR CHAMBER DEPTH (ACD)

Just like all other length measures ACD is assessed with laser optical coherence technology. Combined with the CCT measurement, LENSTAR provides the user with the anatomical as well as with the ACD as measured by ultrasound biometer.

## AXIAL LENGTH (AL)

Optical coherence technology using a super luminescence diode as light source allows the measurement of the axial length of the patient's eye on the true optical axis in unmatched precision and through dense cataracts.

## ECCENTRICITY OF THE OPTICAL AXIS

The eccentricity of the optical axis, an important parameter for laser refractive procedures, is measured with respect to the centre of the white to white circle but also with respect to the pupil centre, the reference to the refractive laser systems.

## SPECIAL EYE CONDITIONS

All of the described measurements are available for the measurement of the "normal" eye cataract patient as well as for the aphakic, pseudophakic and silicone oil filled eye conditions. In case of an error, you may even change the selected eye condition after completion of the measurement procedure.

# Reach for the stars ...

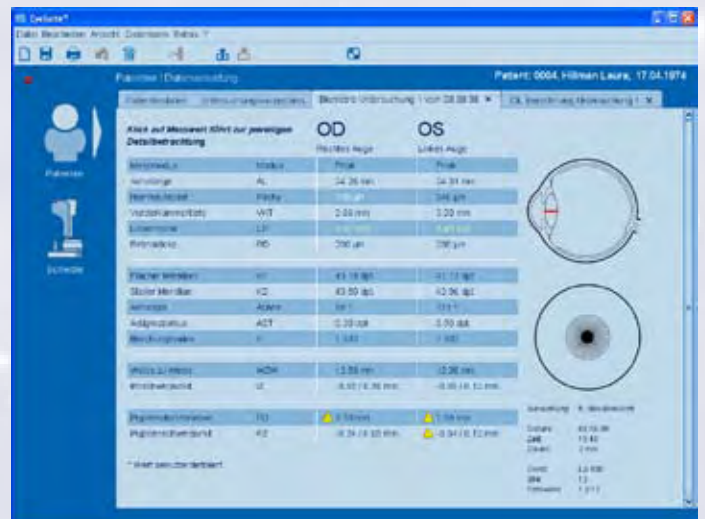
## Best measurements for optimum IOL prediction

LENSTAR provides the user with a complete assessment of the human eye in highest precision using optical coherence technology. The patient fixates the measurement beam, ensuring that all length measurements are taken on the true optical axis.



## Ready for the future in IOL power calculation

The integrated IOL power calculator incorporates all state of the art IOL prediction formulas such as Haigis, Holladay, Hoffer Q SRK II and SRK/T. Measuring more than just all parameters for currently standard formulas, LENSTAR is ready of the next generation of IOL power estimation formulas.



# Comprehensive measurements for optimal IOC calculation ...



## Intuitive and open

Combined with the IOL power calculator, LENSTAR features a sophisticated data base to handle the user's preferred IOL collection. All standard parameters, including three power ranges with independent step sizes for the available IOL power as well as complementary data fields allow to store complete information on the IOL used.



# Ergonomic solutions for you and your patients ...



LS 900 on HMS 901 IT height adjustable instrument table combined with a small form factor bare bone PC.



Space saving solution; LS 900 on HMS 901 instrument table in combination with a laptop.



Using LS 900 on a Unit is easy because of the separation of the examination unit from the PC used, example LS 900 on a HS 2010 unit.

# LENSTAR LS 900<sup>®</sup> technical specifications ...



## MEASURED VARIABLES

### Corneal thickness (CT)

Measurement range	300 – 800 $\mu$ m
Display resolution	0.1 $\mu$ m
In-vivo repeatability	(1.s) +/- 2 $\mu$ m
Accuracy of glass plate thickness	+/- 2 $\mu$ m

### Anterior chamber depth (AC)

Measurement range	1.5 - 5.5 mm
Display resolution	0.01 mm
In-vivo repeatability	(1.s) +/- 50 $\mu$ m
Accuracy of glass plate thickness	+/- 30 $\mu$ m

### Lens thickness (LT)

Measurement range	0.5 – 6.5 mm
Display resolution	0.01 mm
In-vivo repeatability	(1.s) +/- 50 $\mu$ m
Accuracy of glass plate thickness	+/- 30 $\mu$ m

### Eye length (AL)

Measurement range	14 – 32 mm
Display resolution	0.01 mm
In-vivo repeatability	(1.s) +/- 30 $\mu$ m
Accuracy of glass plate thickness	(+/-) +/- 30 $\mu$ m

### Keratometry

Measurement range for radius	5 – 10.5 mm
Display resolution	0.01 mm
In-vivo repeatability	(1.s) +/- 20 $\mu$ m
Accuracy of measuring sphere	+/- 25 $\mu$ m
Measurement range for axis angle	0-180°
Display resolution	1°
In-vivo repeatability	(1.s) +/- 5°
Accuracy of test object	(R7.85/R8.35) +/- 1°

### White-to-white distance

Measurement range	7 - 16 mm
Display resolution	0.01 mm
In-vivo repeatability	(1.s) +/- 0.3 mm
Accuracy of test object	(+/-) +/- 0.1 mm

### Pupillometry

Measurement range	2 – 13 mm
Display resolution	0.01 mm
In-vivo repeatability	(1.s) +/- 0.1 mm
Accuracy of test object	(+/-) +/- 0.05 mm

The above mentioned measurement ranges base on the standard setting of the device for automatic measurement and analysis.

The user may change these setting manually to facilitate measurements outside the standard measurement range.

## OPTICAL RADIATION

### Eye length measurement (A-Scan) and central fixation

Light source	Superluminescence diode
Wave length	820 nm
Power on patient's eye	< 0.6 mW
max. load per patient/day	30 000 s

### Keratometry

Light source	LED
Wave length	950 nm
Power on patient's eye	< 0.2 mW
max. load per patient/day	30 000 s

### Peripheral fixation

Light source	LED
Wave length	570 nm
Power on patient's eye	< 0.02 mW
max. load per patient/day	30 000 s

### Green illumination

Light source	LED
Wave length	525 nm
Power on patient's eye	< 0.2 mW
max. load per patient/day	600 s

The combination of radiation generated corresponds to laser class I, according to IEC 60825-1.

Pick your star ...

Advance to the future ...

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