ALADDIN

Optical Biometry and Topography System





ALADDIN addresses the limitations of conventional biometers



The complete picture - enhanced

With the combination of an optical biometer and full corneal topographer, Topcon pioneered the concept of "the complete picture" in IOL power calculation. Now the complete picture has been enhanced with the addition of the Barrett Universal formula and Olsen formula as a standard component of the ALADDIN.

The final optical result and patient's satisfaction are paramount in today's cataract surgery. With the incorporation of the latest in IOL calculation formulae, the ALADDIN remains at the forefront of IOL calculation technology.

1 Instrument; 9 Functions

- » Axial length
- » Keratometry
- » Anterior chamber depth
- » Central corneal thickness
- » Lens thickness
- » Corneal topography
- » Corneal wave-front analysis
- » Pupillometry
- » White-to-white

ALADDIN features

Fully integrated patient database

- » Patient search function
- » Input post refraction data

Easy acquisition 9-in-1

» Pre-op input of lens and vitreous body

Conventional IOL calculation formulae

- » SRK II, SRK/T, Hoffer Q, Holladay 1, Haigis
- » Multiple surgeon pre-settings
- » ULIB database compatible
- » Database customizable

Post refractive IOL calculation formulae

» Camellin-Calossi, Shammas (no history)

Generic toric IOL calculation

- » Toric IOL rotation simulator
- » Abulafia-Koch Astigmatism Formula

Barrett & Olsen formulae

» With the Barrett Rx, the Barrett Toric Calculator Formula, the Barrett True K and the Barrett Universal II formulae.

Topography

- » Full featured corneal mapping
- » Accurate corneal radii
- » Keratoconus probability index

Corneal wave front (Zernike) analysis

- » Maps (pupil size 2.5 7.0 mm)
- » Simulation graphs

Interferometer graphs

- » Axial length
- » Central corneal thickness
- » Anterior chamber depth
- » Lens thickness

Pupillometry

- » Dynamic, Photopic, Mesopic
- » Decentralization and Latency graph

White-to-white measurement

Reports

- » Biometry report (AL, K, ACD, LT, CCT, WTW)
- » To USB, shared folder and printer
- » Topography report
- » IOL report
- » Pupillometry

DICOM™ Compliance

IMAGEnet®6 Compliance

DICOM™ Compliance

The DICOM panel in the ALADDIN Connectivity section allows the user to set the needed parameters for the connections to the available DICOM features:

- » Modality Worklist
- » Patient Root Query
- » Storage
- » Storage Commitment





Speed

Point and shoot acquisition, all necessary measurements are taken in under five seconds. Single measurements are supported for even faster ACD, AL or topography, as well as a separate full pupillometry.

Accuracy

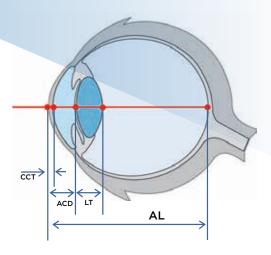
Proven interferometry accuracy combined with new technology for keratometry, provide extremely accurate axial length and corneal radii information for precise calculation of IOL spherical and toric powers.

Posterior & Anterior interferometry

You get the complete picture for all cataract surgeries. Whether you are performing standard cataract surgery or premium IOL implantation, you will be screening for corneal aberrations, Keratoconus and previous corneal refractive surgery procedures all at once. The ALADDIN only requires just one acquisition.

Biometry results are complemented with anterior topography, Zernike analysis and pupillometry.

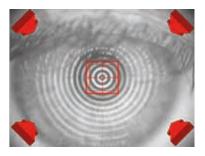
ALADDIN also provides anterior measurements such as the Central Corneal Thickness (CCT), Anterior Chamber Depth (ACD) and Lens Thickness (LT).

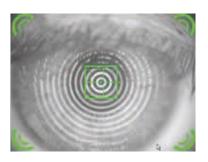


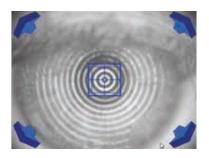
Ease of use

The operator is only three clicks away from printing the ALADDIN report. The 10.1 inch full color touch screen monitor is very responsive and comfortable to use. The user-friendly interface guides you through the main functions with ease.

Making an acquisition has never been easier. To ensure complete accurate biometry, the ALADDIN guides you in focus and alignment with visual color coded signs while taking the acquisition.







Barrett and Olsen formulae



Dr. Graham D. Barrett



The ALADDIN's Barrett Formula Suite includes the Barrett Rx, the Barrett Toric Calculator Formula, the Barrett True K and the Barrett Universal II formulae. Aberrometry analysis (Zernike)



Dr. Thomas Olsen

Onboard Barrett Formula

Dr. Graham D. Barrett developed the Barrett formula in 2013 and takes into account the posterior cornea considering the lens position for each individual patient instead calculating IOL power by estimating lens thickness based on patient's age. The Barrett formula uses the Universal II, which is a method of predicting IOL power to work out where the lens is and utilizes that information to calculate the effect of the cylinder power at the cornea. The Universal II formula was also developed by Dr. Barrett. Dr. Barrett's formula considers the thickness and shape of the lens as well, which provides a more sophisticated way of predicting and translating the cylinder power. The formula is able to predict posterior corneal curvature without actually measuring it. The new version of the ALADDIN, accurately measures the lens thickness, an important component of the Barrett formula.

Onboard Olsen Formula

The ALADDIN HW3.0 provides precise measurements of the internal structures of the eye including Central Corneal Thickness and crystalline Lens Thickness. Those measurements used in combination with the onboard Olsen IOL calculation formula provides accurate IOL power calculations in virtually all types of eyes regardless of size. The Olsen formula utilizes a newly developed concept by Dr. Olsen called the C-constant which predicts the Effective Lens Position (ELP) when performing in-the-bag IOL implants. This model also predicts the lens position of anterior chamber IOLs. The C-constant approach performs independently of other conventional measurements such as axial length, keratometry, white-to-white length, IOL power, etc. It will provide accurate IOL calculations in any type of eye.

Abulafia-Koch astigmatism cylinder correction for Toric IOL calculations incorporated

The Abulafia-Koch correction formula calculates the estimated total corneal astigmatism based on standard keratometry measurements.

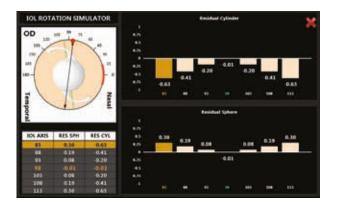


Dr. Adi Abulafia



Dr. Douglas Koch





Precise Toric IOL calculation

A robust generic Toric IOL calculator is incorporated into the ALADDIN software. This integrated toric IOL calculator saves time and avoids unnecessary mistakes when manually entering data online. IOL toric rotation simulation software calculates the induced spherical and cylindrical power for every five degrees that the toric IOL rotates. Surgically Induced Astigmatism (SIA) and Incision Location (IL) can be inserted by the surgeon and are taken into account for the Toric IOL calculation.

Axial length

Using a low-coherence interferometry system with a super luminescent diode of 830 nm and signal processing, the ALADDIN achieves axial length measurement with high signal-to-noise ratio and is able to penetrate even high grade dense cataracts. Axial length measurements can be done on normal eyes as well as on aphakic, pseudo-aphakic and silicone oil-filled eyes.



Anterior biometry

Anterior biometry with the ALADDIN makes it possible to measure Central Corneal Thickness (CCT), Anterior Chamber Depth (ACD) and the crystalline Lens Thickness (LT). ACD is measured through interferometry providing high precision and reproducibility. All interferometry measurements are shown in a single graph quick reference.





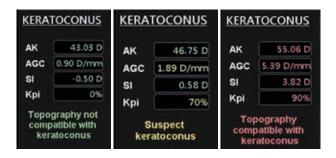
Aberrometry analysis (Zernike)

Zernike analysis of the topographic data provides the Optical Path Difference (OPD) and information on astigmatism, spherical aberrations, higher order aberrations and Coma for pupil sizes of 2.5 mm to 7.0 mm. When using the actual spherical aberration provided by Zernike analysis, you can select the appropriate aspherical IOL with standardized spherical aberration correction according to the patient's individual required spherical aberration.

Keratometry / Topography

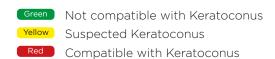
Full corneal topography provides substantially more information than conventional central keratometry. Corneal topography data is especially useful in the selection of toric IOL's to quickly differentiate regular and irregular astigmatism as well as corneal aberrations. The ALADDIN provides accurate corneal topography obtained from the reflection of a set of 24 Placido rings in combination with a low coherence interferometer.





Keratoconus screening

The ALADDIN is capable to screen the corneal surface for Keratoconus probability. This information provides the surgeon in detail the corneal keratometric indices to assist in making the correct toric IOL selection. The Keratoconus Probability Index is shown in percentage as well as in color codes.



Pupillometry

During Placido evaluation, pupillary response is observed to assess a pseudo Photopic and pseudo Mesopic pupil size, indicating response and normal range of the pupil. Full pupillometry screening assists to evaluate eyes for multifocal IOL implantation or refractive surgery. For any refractive procedure it is important to carefully

evaluate the pupil size in different light conditions to address cases of extremely small or decentered pupils. The ALADDIN can perform pupillometry in three different modes:

- » Dynamic
- » Photopic
- » Mesopic





White-to-white

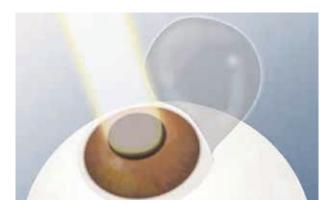
The ALADDIN automatically measures white-to-white length which can be manually edited. Reliable white-to-white measurement is used for anterior chamber intraocular lens and sulcus fixated posterior chamber intraocular lens calculation in highly myopic eyes.





Post refractive IOL

In eyes that have previously undergone refractive surgery such as RK, PRK, Lasik, Lasek, LK and PTK, spherical aberrations are often outside the standard values. In these cases the ALADDIN provides the Camellin-Calossi and the Barrett



True K formulae. If there is no patient history the Shammas (no history) or the Barrett True K formulae can be used for the correct IOL calculation.



Customizable IOL database

The ALADDIN provides a full ULIB database which can be easily upgraded and customized. The surgeon can manually upgrade the A-constant for each individual IOL to obtain even a higher accuracy every time a cataract surgery is performed. Favorite IOL's can be selected and programmed for each surgeon, making IOL selection simple and personalized.





IMAGEnet®6 viewer software

IMAGEnet®6 is Topcon's web based digital software platform for ophthalmic imaging, capable of acquiring, displaying, enhancing, analyzing, and saving digital images and reports obtained with a variety of Topcon devices such as the ALADDIN. IMAGEnet®6 provides flexibility of viewing Biometry, Keratometry, Pupillometry data and all available ALADDIN exported reports in a network environment. There are a variety of software configurations available. Additional components can be added according to your clinic's needs.





Screenshot of Biometry data in IMAGEnet®6

Topcon's Cataract Workstation



KR-800S Auto kerato-refractometer with subjective function

- 1 VA check far vision
- ² VA check near vision
- 3 VA check glare condition
- 4 VA check contrast condition
- Grid test (AMD screening)
- 6 VA simulation Premium IOL





KR-800S



Pre-Operative Subjective Refraction and Pre-OP-diagnostics

Cataract surgery quality control

Topcon's Cataract Workstation

Visual acuity (VA) is the most common clinical measure of the quality of cataract surgery. It is how the success of surgery is measured and it is therefore critical that it is measured correctly. Measurement of VA must be standardized and systematic. Topcon's KR-800S Auto Kerato-Refractometer with subjective VA check will do exactly that. With the KR-800S the VA can be subjectively tested before and after cataract surgery. With the unique features of the KR-800S such as Glare test and Contrast test, the progression and differentiation of nuclear cataract from cortical cataract can be evaluated.

Premium IOL simulation

The KR-800S offers a spherical equivalent mode, which can simulate the benefit of a premium (toric) IOL, to encourage the patient to reach an even higher post-operative VA. The subjective VA test for near vision will demonstrate the benefits of a multifocal IOL to the patient.

ALADDIN



Pupillography Topography Biometry incl. K1 & K2 IOL Calculation



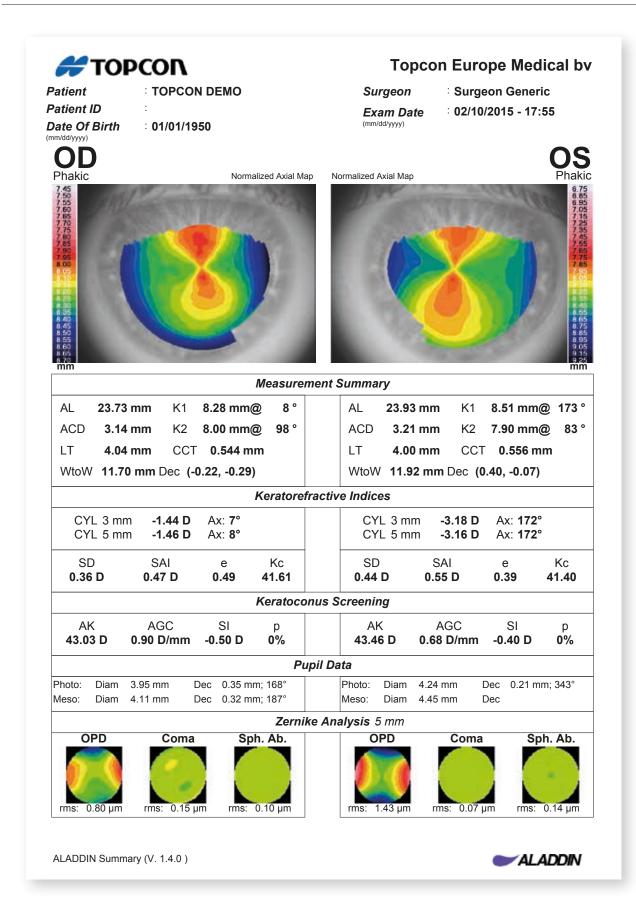
Cataract Surgery

KR-800S



Post-Operative Subjective Refraction and Post-OP-diagnostics

Reports measurement summary





: TOPCON DEMO **Patient**

Patient ID

Date Of Birth : 01/01/1950

Phakic

Data Measurements n: **1.3375**

Aladdin Optical

8° AL : 23.73 mm K1 : 8.28 mm @ 98° ACD : 3.14 mm K2 : 8.00 mm @ 4.04 mm CYL : -1.45 D ax LT 8°

CCT 0.544 mm

Target Refraction:

Oculentis L-313				MF30
SR	K/T		SR	KII
IOL(D)	REF(D)		IOL(D)	REF(D)
20.50	0.83		21.00	0.77
21.00	0.47		21.50	0.37
21.50	0.10		22.00	-0.03
22.00	-0.27		22.50	-0.43
22.50	-0.64		23.00	-0.83
IOL @ Target 21.64	A = 118.100		IOL @ Target 21.97	A = 118.600

Oculentis

LU-313 MF301			
Haigis			
IOL(D)	REF(D)		
21.50	0.58		
22.00	0.21		
22.50	-0.16		
23.00	-0.54		
23.50	-0.92		
IOL @ Target	A0 = 0.870		
22.28	A1 = 0.400		

Oculentis LS-412Y

Hoffer Q			
IOL(D)	REF(D)		
21.00	0.86		
21.50	0.51		
22.00	0.16		
22.50	-0.20		
23.00	-0.56		
IOL @ Target	pACD = 5.070		
22.22			

Oculentis LU-800 RZI

	\ <u></u>		
Holladay I			
IOL(D)	REF(D)		
19.00	0.90		
19.50	0.52		
20.00	0.13		
20.50	-0.25		
21.00	-0.65		
IOL @ Target 20.17	SF = 0.310		

Topcon Europe Medical by

SURGEON GENERIC Surgeon

Exam Date (mm/dd/yyyy) : 02/10/2015 - 17:55

Data Measurements n: 1.3375

Aladdin Optical

AL : 23.93 mm K1 : 8.51 mm @ 173 ° ACD: 3.21 mm K2: 7.90 mm @ 83° LT 4.00 mm CYL: -3.06 D ax 173°

CCT 0.556 mm

Target Refraction: 0

Oculentis	Oculentis
Oculentis	Oculentis
L-313	LS-313 MF30

SR	K/T	
IOL(D)	REF(D)	IOL
20.50	0.67	21.
21.00	0.31	21.
21.50	-0.06	22.
22.00	-0.43	22.
22.50	-0.81	23.
IOL @ Target	A = 118.100	IOL @ Ta
21.42		21.77

SRK II			
IOL(D)	REF(D)		
21.00	0.62		
21.50	0.22		
22.00	-0.18		
22.50	-0.58		
23.00	-0.98		
IOL @ Target	A = 118.600		

Oculentis LU-313 MF30T

Haigis			
IOL(D)	REF(D)		
21.00	0.81		
21.50	0.45		
22.00	0.08		
22.50	-0.30		
23.00	-0.67		
IOL @ Target	A0 = 0.870		
22.10	A1 = 0.400		
22.10	A2 = 0.100		

Oculentis LS-412Y

Hoffer Q		
IOL(D)	REF(D)	
21.00	0.72	
21.50	0.37	
22.00	0.01	
22.50	-0.35	
23.00	-0.71	
IOL @ Target	pACD = 5.070	

22.02

Oculentis **LU-800 RZI**

	·—·		
Holladay I			
IOL(D)	REF(D)		
19.00	0.76		
19.50	0.38		
20.00	-0.01		
20.50	-0.40		
21.00	-0.80		
IOL @ Target 19.99	SF = 0.310		

IOL Calculator (V. 1.4.0)



Reports generic toric IOL calculation

TOPCON

Topcon Europe Medical BV

Patient: TOPCON DEMOSurgeon: Surgeon GenericPatient ID: \sim $E_{xam Date (dd/mm/lyyyy)}$: 10/02/2015 - 17:55

Date Of Birth : 01/01/1950

OS Phakid

Measures (Aladdin Optical)

K1: 39.64 D AL: 23.93 mm LT: 4.00 mm WTW: 11.98 mm
K2: 42.71 D ACD: 3.21 mm CCT: 0.556 mm WTW Dec (0.40,-0.07) mm

CYL: **-3.06 D @ 173°** n: **1.3375**

Toric IOL

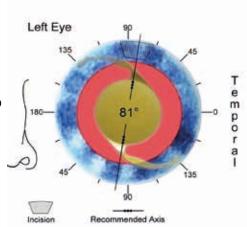
Target Refraction: 0.00 D SIA: 0.00 D IL: 83°

Toric IOL: Oculentis LS-313 T3 21.50 D (S.E.) 3.00 D @ 81°

LF = 1.412, A constant = 118.100

Cylinder Power: IOL Plane 3.00 D ~ Corneal Plane 2.20 D

Predicted refraction: 0.07 D sph. -0.03 D @ 81°



IOL Power (S.E.)	Refraction (S.E.)	IOL submodel	IOL toricity	Residual astigmatism
20.50 D	0.81 D	LS-313 T1	1.50 D	-1.07 D @ 171°
21.00 D	0.43 D	LS-313 T2	2.25 D	-0.52 D @ 171°
21.50 D	0.06 D	LS-313 T3	3.00 D	-0.03 D @ 81°
22.00 D	-0.33 D	LS-313 T4	3.75 D	-0.58 D @ 81°
22.50 D	-0.71 D	LS-313 T5	4.50 D	-1.13 D @ 81°

BarrettUniversalIIToric (v1.6.0 RC) 2017/01/20 11:45:31







Patient Information		
Patient TOPCON DEMO	Surgeon SURGEON GENERIC	
Patient ID	Clinic Topcon Europe Medical bv	os
Date of Birth 01/01/1950 mm/dd/yyyy	Exam Date 02/10/2015 - 17:55 mm/dd/yyyy	

Biometry Data							
AL (mm)	23.93	LT (mm)	4.00	K1 (mm)	8.51	CYL (D)	-3.06@173°
ACD (mm)	3.21	CCT (mm)	0.556	K2 (mm)	7.90	n	1.3375

Surgical Pre Op Data						
SEQ (D)	23.00	SIA (D)	0			
Formula	Holladay I	IL (°)	83			

OLG (D)	_0.00	Oli ((D)	•
Formula	Holladay I	IL (°)	83
			SF = 1.980
	Toric IC	DL	

Lens Mo	odel
Alcon	AcrySof SN6AT6

Spherical Power Cylindrical Power

21.50 D 3.75 D

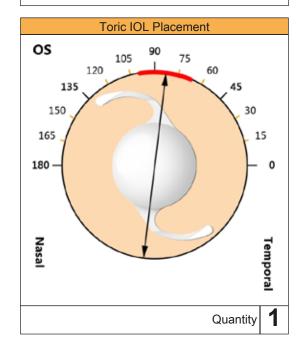
Sph. Equiv. Power Axis Of Placement

23.38 D 83°

Expected Refraction

-0.02D -0.44 D @ 173°

Lens	Residual Astigmatism		
AcrySof SN6AT4 (22.00D 2.25C)	-1.48 D @ 173°		
AcrySof SN6AT5 (21.50D 3.00C)	-0.96 D @ 173°		
AcrySof SN6AT6 (21.50D 3.75C)	-0.44 D @ 173°		
AcrySof SN6AT7 (21.00D 4.50C)	-0.08 D @ 83°		
AcrySof SN6AT8 (20.50D 5.25C)	-0.60 D @ 83°		



Notes

1.4.0

Reports generic toric IOL calculation

TOPCON

Topcon Europe Medical bv

 Patient
 : TOPCON DEMO
 Surgeon
 : Surgeon Generic

 Patient ID
 : Exam Date (mm/dd/yyyy)
 : 02/10/2015 - 17:55

Date Of Birth : 01/01/1950

OD Phakic OS Phakic

Axial length values				
Comp. AL: 23.73 mm		Comp. AL: 23.93	mm	
AL	AL	AL	AL	
23.79 mm		23.95 mm		
23.77 mm		23.91 mm		
23.72 mm		23.85 mm		
23.73 mm		23.93 mm		
23.73 mm		23.96 mm		
23.72 mm		23.94 mm		

		Value C	orne	eal Curvature			
KER: 8.28/8.00 mm	CYL: -1.45 D A	x 8°		KER: 8.51/7	.90 mm CYL	: -3.06 D Ax	173°
K1: 8.28 mm @ 8° 40.74 D		Ti i	K1: 8.51 mm @ 173°			39.64 D	
K2: 8.00 mm @ 98° 42.19 D		42.19 D		K2: 7.90 mm @ 83°			42.71 D
CYL: -1.45 D ax 8°			CYL: -3.06 D ax 173°				
		Δ.	CD	value			
ACD: 3.14 mm				ACD: 3.21	mm		
3.14 mm				3.21 mm			
•			LT v	/alue			
LT: 4.04 mm				LT: 4.00	mm		
4.04 mm				4.00 mm			
·		C	Tv	alue			
CCT: 0.544 mm				CCT: 0.556 mm			
		Whit	e to	White			

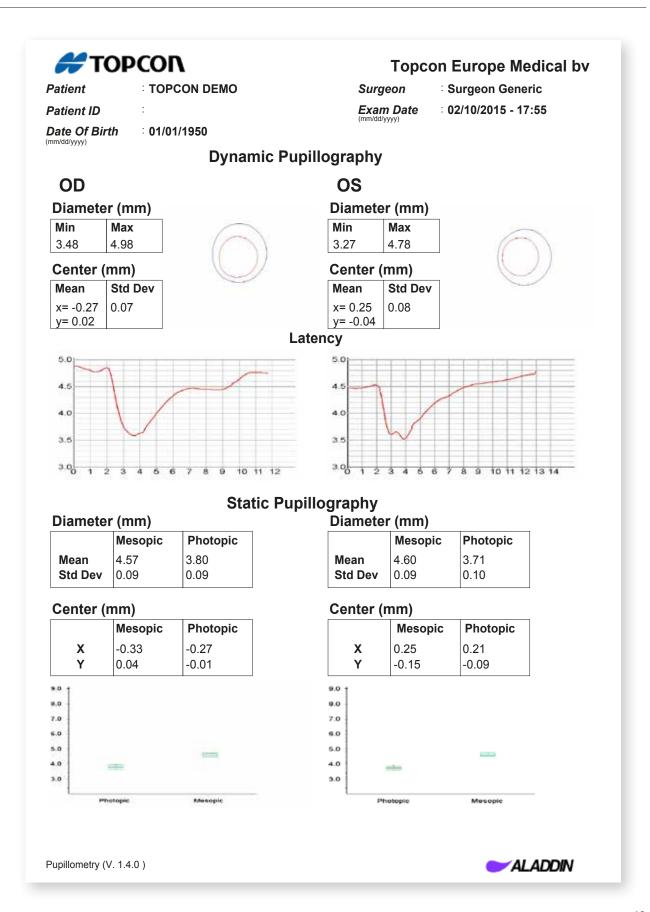
WTW 11.92 mm Dec (0.40 mm, -0.07 mm)

Overview Biometer Measurements (V. 1.4.0)

WTW 11.70 mm Dec (-0.22 mm, -0.29 mm)



Reports generic toric IOL calculation



Measurement range for IOL					
Axial length (Interferometry)	Super luminescent diode 830nm, 15.00 mm - 38.00 mm				
Corneal radii	5.00 mm - 12.00 mm / 28.00D - 67.50D				
Anterior chamber depth measurement	interferometer 1.50 mm - 6.50 mm				
White-to-white measurement	8.00 mm - 14.00 mm				
Pupillometry	Dynamic, Photopic & Mesopic, pupil size 0.50 mm - 10.00 mm				
Lens thickness (interferometry)	1.50 mm - 6.50 mm (phakic) 0.50 mm - 3.50 mm (pseudo-phakic)				
Central Corneal Thickness measurement (interferometry)	0.300 mm - 0.800 mm				
Onboard calculation formulae					
IOL formulae	Haigis, Hoffer Q, Holladay 1, SRK*II & SRK*T, Barrett Universal II, Olsen				
Post Refractive IOL formulae	Camellin-Calossi & Shammas (no history) Olsen, Barrett True K				
Placido Topography specifications					
Keratoscopic Cone (topographic map)	24 rings on a 43 dpt sphere, working distance 80 mm				
Points analyzed	over 100,000				
Points measured	over 6,000				
Cornea coverage	up to Ø 9.8 mm (on a 8 mm sphere) 42.20D with n=1.3375				
Guided focus system	yes				
Keratoconus screening					
Apical curvature	yes				
Apical gradient of curvature	yes				
Symmetry index	yes				
Kpi (Keratoconus probability index)	yes				
Software features					
Toric IOL calculator	Generic Toric IOL, Oculentis Toric IOL				
Zernike analysis	Pupil size 2.5 mm - 7.0 mm				
Print to	USB printer, Network printer, PDF to shared network folder & PDF to USB drive				
Instrument specifications					
Display	10.1 inch touch screen				
Storage	At least 320 GB HDD + 32 GB SSD				
Operating system	Windows 7 Embedded OS				
Processor	AMD G-T56N				
Internal memory	2 GB RAM				
Power input	AC 100 - 240V, 50 - 60Hz				
Dimensions Weight	320 mm (W) x 490 mm (H) x 470 mm (L)				
Connections	18 kg 1x LAN, 2x USB				
Supports	USB Barcode scanner, External USB keyboard / mouse				
Marking	CE, ETL				
Reports					
ALADDIN report	yes				
Measurement overview	yes				
Pupillometry	yes				
IOL	yes				
Generic Toric IOL	yes				
Oculentis Toric IOL	yes				



Subject to change in design and/or specifications without advanced notice.

In order to obtain the best results with this instrument, please be sure to review all user instructions prior to operation. Medical device Class IIa. Manufacturer: VISIA imaging S.r.l.



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