

# Chronos

Refraction System

Optimise refraction, maximise revenue potential,  
and save space.



OPTICIAN/ OPTOMETRY

 **TOPCON** Healthcare

## COMPACT, RELIABLE REFRACTION

**SYSTEM** that combines binocular refraction and keratometry with binocular subjective visual acuity.

# Chronos

Refraction System



**Tablet-controlled for flexible operating position**

## Optimise refraction, maximise revenue potential, and save space with Chronos.

Enhancing customer throughput, empowering staff, and maximising available space are important elements that should not be overlooked. Chronos addresses each of these issues.

### OVERVIEW



#### OPTIMISE REFRACTION

Chronos offers more than objective refraction: it is a single platform that captures the four key datasets foundational to a thorough examination: binocular refraction and keratometry with binocular subjective visual acuity.



#### MAXIMISE REVENUE POTENTIAL

Chronos has the potential to allow you to see more patients daily, which increases your revenue potential.



#### SAVE SPACE

Chronos, as an all-in-one platform with a small footprint, avoids the need to factor in the patient-chart distance in the room layout, saving space and boosting cost efficiency, as well as providing flexibility on where refraction takes place.



#### SAVE TIME

Chronos saves time by optimising the workflow, eliminating the time needed to clean and move between devices.

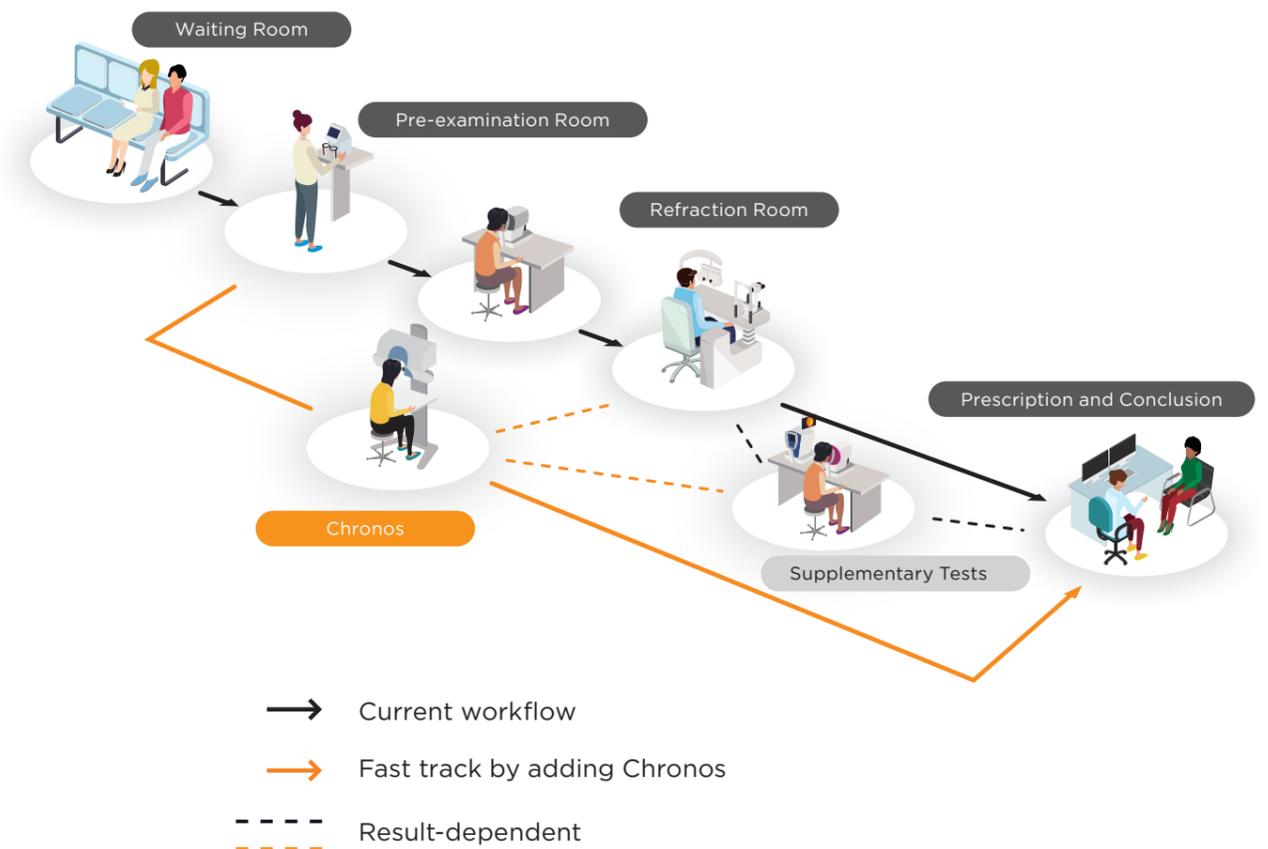
SEE HOW YOU CAN  
STREAMLINE YOUR  
WORKFLOW WITH  
CHRONOS



# CHRONOS- ENHANCED WORKFLOW

**Optimise refraction, maximise revenue  
potential, and save space with Chronos.**

Chronos is a versatile platform that can be positioned according to  
your needs in different scenarios.



## SightPilot™ is optimised for efficient workflow, maximising revenue potential.

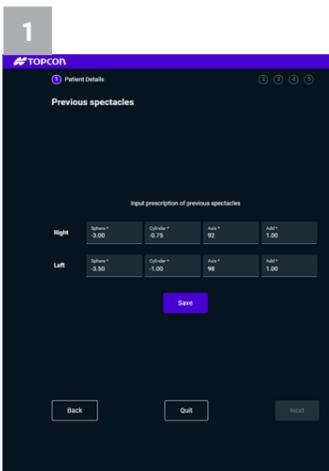
SightPilot™ is an optional user interface that provides a step-by-step guide through the refraction process. At each step, the operator is given instructions on how to proceed with the refraction based on the patient's response.



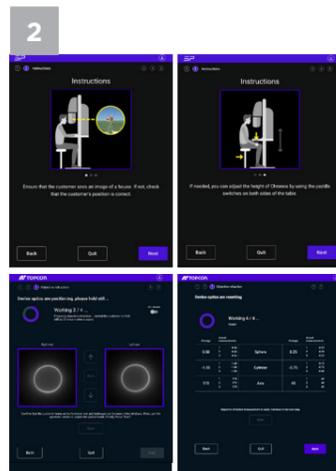
## SightPilot™ Simplify Refraction



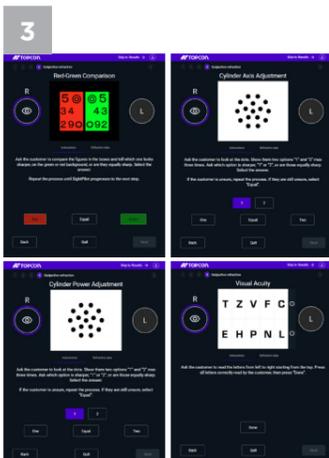
- Binocular objective refraction
- Measurement of Visual Acuity (VA) with previous prescription or unaided<sup>1</sup>
- VA screening with objective refraction
- Red/green test
- Cross cylinder
- Final monocular VA with subjective result
- Binocular balance
- Final binocular VA with subjective result
- Near addition refinement
- VA at near
- SightPilot refraction vs. Previous Spherical Equivalent
- SightPilot refraction vs. Previous spectacles /unaided



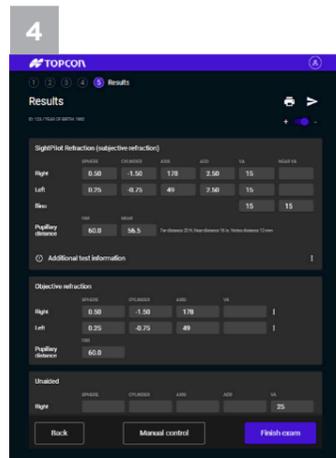
**1 Patient Details**  
Enter the patient information and import/enter the previous spectacle prescription to begin the refraction<sup>1</sup>.



**2 Objective Refraction**  
SightPilot™ provides step-by-step instructions to position the patient and then automatically aligns the optics to complete the objective refraction.



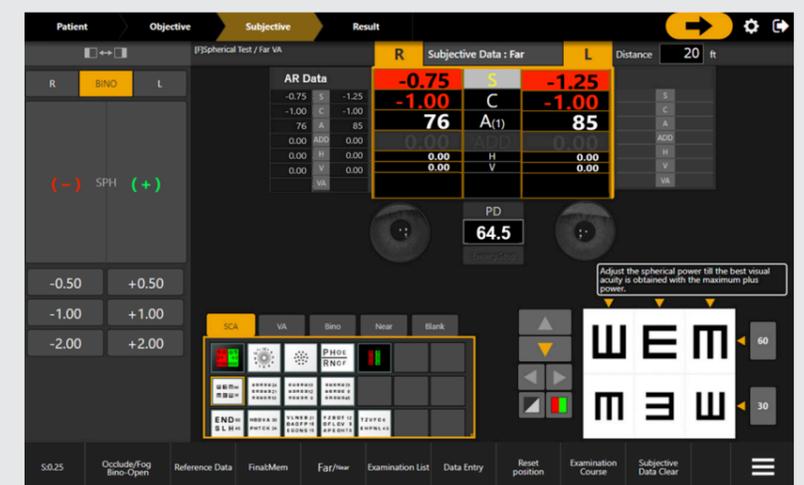
**3 Subjective Refraction**  
SightPilot™ walks the operator through a variety of subjective refraction tests including visual acuity charts, red-green comparison, cylinder adjustment, binocular balancing and near addition charts. On-screen prompts enable quick input of the patient's response, before advancing to the next step.



**4 Results**  
When the refraction is complete, the results are displayed on the screen and may be printed or sent to the patient's EHR file.

## CHRONOS STANDARD INTERFACE

Chronos can be used as a binocular refractometer and digital phoropter, by making use of the standard control interface. It offers full customisation of the refraction routine, a wide range of tests including tests to assess binocular status, and the option to create and save one or more refraction routines to suit your preference, or the needs of certain patient groups.



<sup>1</sup> Previous prescription can be entered manually or imported directly from your Topcon lensmeter (SOLOS [Manufactured by VISIA IMAGING S.R.L.] or CL-300)

# Chronos

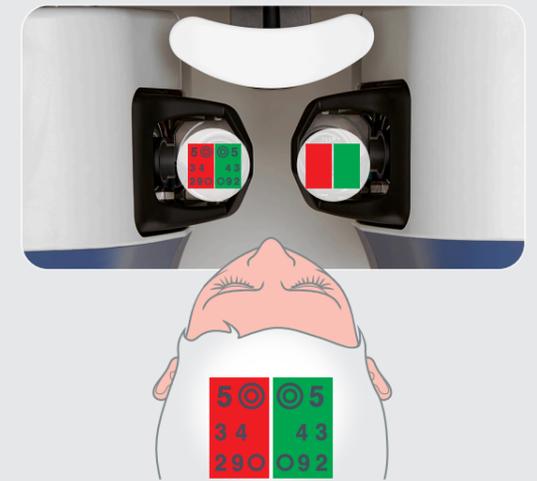
Refraction System

With Chronos **automated binocular refraction system**, spend more time on what matters most: your patients.

## Chronos Unique Technology

### Chronos binocular refraction technology

Chronos measures both autorefraction and subjective refraction under binocular viewing conditions, for a more natural, comfortable visual experience. Binocular refraction has been shown to provide better control of accommodation for objective and subjective end points.



### Reduce alignment errors with Chronos auto-alignment

Chronos uses Topcon's 3D stereo camera technology to optimise alignment throughout testing, pioneered in Topcon's automated OCTs and retinal cameras.



### Cutting-edge moving lens system

Chronos incorporates a cutting-edge moving lens system, enabling rapid and smooth changes in a lens power. This provides a more comfortable visual experience for the patient.



**Ease of test distance adjustment**

A combination of the built-in  $\theta$  movement mechanism of the heads and the lens movement, adjusts the convergence angle and allows different testing distances.

**TEST DISTANCE**

Far-/Near-point test distance can be set  
**25cm - 609.6cm**

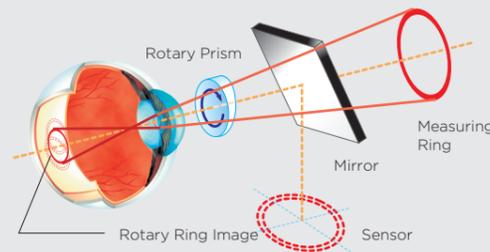


**Accuracy with Chronos**

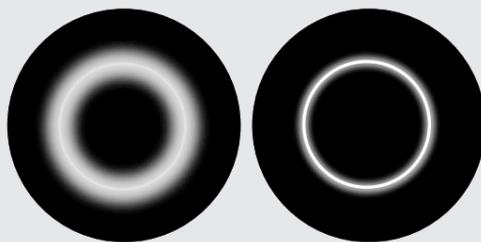
A combination of the super luminescent diode (SLD) ring, rotary prism technology and binocular objective refraction, provides stable measurements, including in patients with a degree of media opacification.



Measured simultaneously



Patented Rotary Prism Technology



Conventional ring

Chronos ring

**Objective measurement**

<b>Refraction measurement range</b>	Spherical refractive power	-25D - +22D <sup>1,2</sup>
	Cylindrical refractive power	-10D - 0D <sup>1,2</sup>
	Cylinder axis angle	1° - 180°
<b>Corneal curvature measurement range</b>	Corneal curvature radius	5.00mm - 10.00mm
	Corneal refractive power	67.50D - 33.75D (Conversion value when the corneal refractive ratio is 1.3375)
	Corneal principal meridian angle	1° - 180°
<b>Minimum measurement unit</b>	Spherical/cylindrical refractive power	0.12D
	Cylinder axis angle	1°
	Corneal curvature radius	0.01mm
	Corneal refractive power	0.12D
<b>Display of measured value</b>	Displayed on the screen of the operation controller	
	<b>Minimum measurable pupil diameter</b>	Φ2.0mm
<b>PD measurement range</b>	50mm - 80mm	
<b>Minimum PD measurement unit</b>	0.5mm	

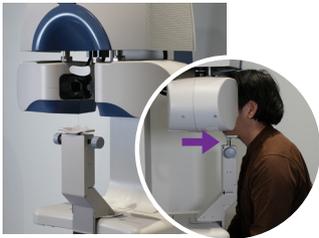
**Subjective measurement**

<b>Refraction measurement range</b>	Spherical refractive power	-18.00D ≤ Equivalent spherical power ≤ +18.00D <sup>3</sup>
	Cylindrical refractive power	-8.00D ≤ Cylindrical refractive power (Cylindrical power) ≤ 0.00D <sup>4</sup>
	<i>All conditions stated on the right must be met<sup>5</sup></i>	
	Cylinder axis angle	1° - 180°
<b>Minimum measurement unit</b>	Horizontal prism (one eye movable range)	±15.0Δ <sup>6</sup>
	Vertical prism (one eye movable range)	±2.5Δ
	Spherical/ADD refractive power	0.25D
<b>Test distance</b>	Cylindrical refractive power	0.25D
	Cylinder axis angle	1°
	Prism refractive power	0.1Δ
<b>Visual acuity measurement range<sup>7</sup></b>	Far-/Near-point test distance can be set between 25cm and 6.096m	
<b>Chart</b>	Visual acuity test chart, spherical power correction test chart, astigmatism test chart and binocular function test chart	
<b>Background luminance</b>	155±15cd/m <sup>2</sup>	
<b>Display of measured value</b>	Displayed on the screen of the operation controller	
<b>Record of measured value</b>	Printing by thermal printer/external printer, data output	
<b>Measuring head movement</b>	Right-and-left direction	Inside 9mm to Outside 12.5mm
	Up-and-down direction	Down 15mm to Up 15mm
	Back-and-forth direction	Forward: 20mm - Backward: 20mm
<b>Measuring head rotary angle</b>	Convergence 17.5° to divergence 8.5° (eyeball torsion axis centre)	

**Other Specifications**

<b>Dimensions and Weight</b>	Main unit	Dimensions: 510-540mm (H) × 671-766mm (W) × 278-357mm (D)
	Power supply unit	Weight: 31.2 kg
<b>Electric Rating</b>	Source voltage	Dimensions: 276mm (H) × 117mm (W) × 197mm (D) Weight: 3.5 kg
	Frequency	AC100 - 240V
	Power input	50 - 60Hz
		160VA

<sup>1</sup> The dioptric powers are indicated with reference wavelength  $\lambda_d = 587.56 \text{ nm}$   
<sup>2</sup> Spherical refractive power + Cylindrical refractive power ≤ +22D or Spherical refractive power + Cylindrical refractive power ≥ -25D  
<sup>3</sup> The conversion value with "VD=12mm" is described here.  
<sup>4</sup> The conversion value with "VD=-3mm" is described here.  
<sup>5</sup> The value described here is the maximum value. The measurement range is smaller according to the test distance setting for executing a test or the setting conditions of VD during measurement.  
<sup>6</sup> The value described here is the maximum value. The measurable range is smaller according to the combination of the patient's PD and the test distance.  
<sup>7</sup> 0.1 - 1.6 complies with ISO 10938. ETDRS chart using Landolt ring (visual acuity 0.25 - 1.6) complies with ANSI Z80.21.



### CRX-1000 Chronos Chinrest

For more stable measurement,  
an optional chinrest attachment is available.



**Register Now**  
Topcon Healthcare University

**IMPORTANT** In order to obtain the best results with this instrument, please be sure to review all user instructions prior to operation.  
Not all products, services, or offers are available in all markets. Contact your local distributor for country-specific information and availability.



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