



Auto Ref/Kerato/Tono/Pachymeter
TONOREF™ III



THE ART OF EYE CARE



TONOREF III
AUTO REF / KERATO / TONO / PACHY-METER

A MASTERPIECE
of
COMBINATION



The space saving TONOREF™ III
is a comfortable and
efficient upgrade to your practice



Auto Refractometer
Auto Keratometer
Non Contact Tonometer
and
Non Contact Pachymeter

High Measurement Accuracy

Refraction

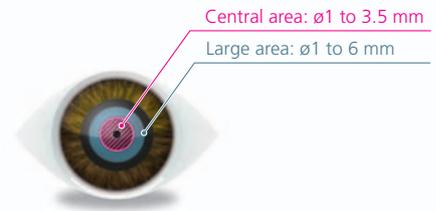
Large Pupil Zone Imaging Method

The use of a wide area measurement within the pupil increases the accuracy of measurement that is more indicative of the subjective refraction.

The large pupil zone imaging method measures the central refraction and a large area refraction.

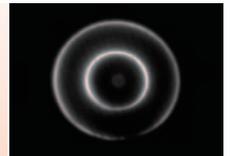
The difference of the measurement allows assessment of the effect of pupil size such as a vision in dim light.

Measurements can be performed on small pupils as small as 2 mm.



Low Confidence Alert

The measurement ring image can be displayed to alert the operator if low confidence measurement occurs.



Ring image

Super Luminescent Diode (SLD) Light and Highly Sensitive CCD Camera

The system combining the SLD light and highly sensitive CCD camera significantly improves measurement capability even in dense cataractous eyes.

Optimal Fogging to Minimize Accommodation

Fogging is performed after correcting the patient's astigmatism with built-in cylinder lenses.

This minimizes the effect of accommodation even of patients with high astigmatism.

Keratometry

Double Mire Ring Method

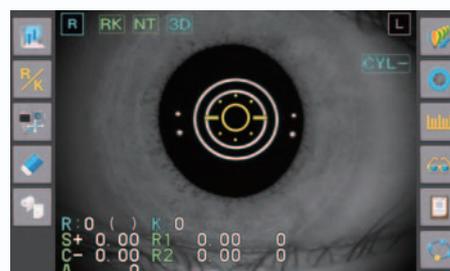
Keratometry measurements performed with the mire ring method reduces interference from the eyelids.

The TONOREFT™ III performs measurements at diameters of 3.3 mm and 2.4 mm.

Comparison of the two values allows a better understanding of the cornea shape.

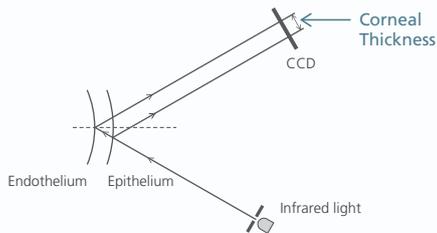


Measurement with double mire ring

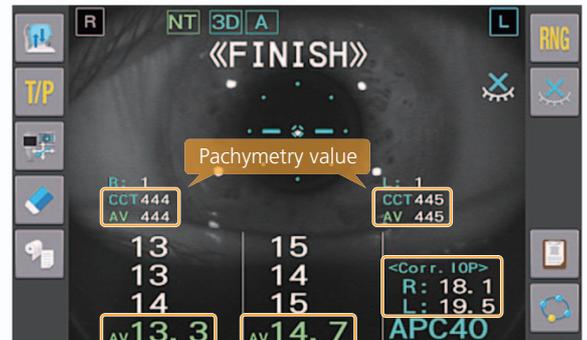


Pachymetry

Non-contact optical pachymetry is used to measure corneal thickness.



The principle of specular reflection for pachymetry allows a more compact design of TONOREF™ III.



The pachymetry data can be used to display a corrected IOP value.

Tonometry

Automated Calculation of Corrected IOP

The TONOREF™ III provides the automated calculation function of the corrected IOP based on the central corneal thickness.

Generally, the IOP is overestimated for thick corneas and underestimated for thin corneas. The corrected IOP value allows a more accurate assessment.



Patient-friendly Air Puff

Automatic Puff Control (APC)

In subsequent measurements, the APC function performs the measurement with the minimum air pressure based on the previous measurement data.

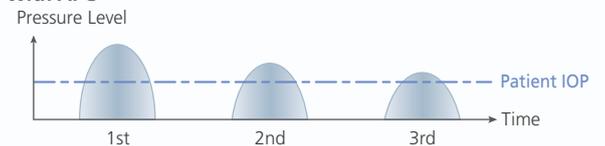
Softer and Quieter Air Puff

The mechanical design of the TONOREF™ III reduces noise and air intensity to achieve a more gentle air puff.

Gentle Nozzle Design

A gentle nozzle design reduces patient's perception of physical pressure.

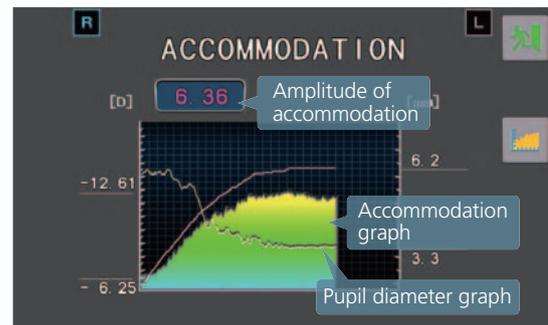
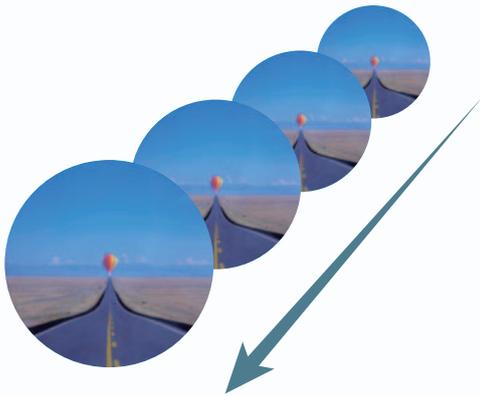
With APC



Clinically Important Functions

Accommodation Measurement

The accommodation measurement helps to assess such as pseudomyopia, eyestrain, and accommodative palsy. Objective measurement of accommodation is performed with patient's focusing on a target which moves from distant to near. Intelligence algorithm detects the patient's response and reduces the measurement time in patients with a slow or weak accommodative response.



Opacity Assessment

Retroillumination Image and NIDEK Cataract Indices

The retroillumination image allows evaluation of media opacity. NIDEK cataract indices indicate the severity of the opacity and helps to assess the progression of pathology.



Eye with light opacity



Eye with dense opacity

NIDEK Cataract Indices

- [COI. H] Opacity size within a diameter of 3 mm in the center (vertical diameter)
- [COI. A] Opacity proportion within a diameter of 3 mm in the center
- [POI] Opacity proportion within the entire periphery

The NIDEK cataract indices are for reference only. The following conditions may indicate different indices from ones of actual status.

- Peripheral image is darkly captured due to alignment position.
- Opacities are not in focus.
- Bright spot reflecting observation light occurs on the cornea apex.
- Position of the 3 mm diameter circle is shifted due to incorrect pupil detection caused by opacity location.

User-friendly Design

Easy to Use Screen

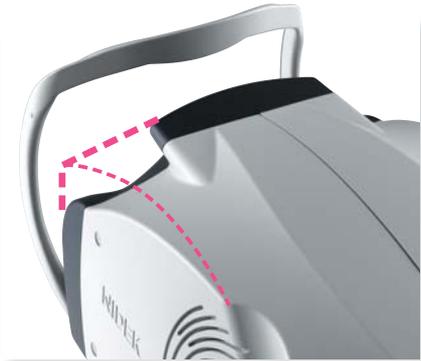
- Tilttable 7-inch color LCD touchscreen
- Summary Display
Summary screen allows easy and quick confirmation of patient data.

ALL	AR	KM	NTP	CS	PS	ACC	RETRO
-R->							
[AR]							
	S	C	A	S	C	A	
	-5.75	-0.75	172	-5.00	-1.00	9	
[KM]							
	R1	R2	deg	R1	R2	deg	
	8.22	7.92	172	8.22	7.95	11	
[NTP]							
	IOP (mmHg)	CCT (um)		IOP (mmHg)	CCT (um)		
	9.7	525		10.0	536		
	Corrected IOP (mmHg)			10.8			



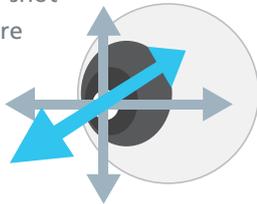
Easy Access to Patients Eyelids

The radical cut design allows direct access to patient eyelids.



3-D Auto Tracking and Auto Shot

The 3-D auto tracking and auto shot provide faster, simpler, and more accurate measurements. Once alignment is completed, the measurement starts automatically.



Joystick for Flexible Alignment

The joystick helps the operator make fine adjustments during alignment to improve the precision, even for eyes with poor fixation which cannot be tracked with automated tracking systems.



Quick and Easy Wireless Data Transfer

NIDEK refraction products allow for quick and easy wireless data transfer* using the Eye Care card, WLAN or infrared communication.

This is helpful for making a simple refraction system without complicated wired connection.

*The specifications for wireless data transfer differ according to each product and from country to country. The requirements also differ depending on the method of wireless data transfer.



Automatic Anti Dew Heater



Automatic anti dew heater for measuring windows prevents condensation to provide accurate measurements in cooler rooms.

1.2. Cilindrinės refrakcijos matavimo ribos

Specifications

1.1. Sferinės refrakcijos matavimo ribos

5. Tarpvyzdinio atstumo matavimo ribos

Auto refractometer	
Measurement range	Sphere -30.00 to +25.00 D (VD = 12 mm) (0.01/0.12/0.25 D increments) Cylinder 0 to ±12.00 D (0.01/0.12/0.25 D increments) Axis 0 to 180° (1°/5° increments)
Minimum measurable pupil diameter	ø2 mm
Measurement area	ø1 to 6 mm
Chart	Scenery chart
Auto keratometer	
Measurement range	Curvature radius 5.00 to 13.00 mm (0.61 mm increments) Refractive power 25.96 to 67.50 D (n = 1.3375) (0.01/0.12/0.25 D increments) Cylindrical power 0 to ±12.00 D (0.01/0.12/0.25 D increments) Axis 0 to 180° (1°/5° increments)
Measurement area	ø3.3 mm (R=7.7 mm), ø2.4 mm (R=7.8 mm)
Non contact tonometer	
Measurement range	1 to 60 mmHg (1 mmHg increments)
Measurement range setting	APC40, APC60 (APC=Automatic Puff Control), 40, 60
Working distance	11 mm
Eye fixation	Inner fixation light
Non contact pachymeter	
Measurements	300 to 800 µm (1 µm increments)
IOP correction by corneal thickness	Automatic calculation
Retroillumination image	Available
Accommodation measurement range	0 to 10.00 D (0.01/0.12/0.25 D increments)
PD measurement range	30 to 85 mm (1 mm increments) (Near point PD: 28 to 80 mm at WD = 40 cm)
Corneal size measurement range	10.0 to 14.0 mm (0.1 mm increments)
Pupil size measurement range	1.0 to 10.0 mm (0.1 mm increments)
Auto tracking	X-Y-Z directions
Auto shot	Available
Display	Tilttable 7.0-inch color LCD with touch panel
Printer	Thermal line printer with easy loading and auto cutter
Interface	RS-232C: 2 port, LAN: 1 port, USB: 1 port Wireless LAN (WLAN)*: 1ch
Power supply	AC 100 to 240 V, 50/60 Hz
Power consumption	100 VA
Dimensions/Mass	260 (W) x 495 (D) x 505 (H) mm / 22 kg at ARK standard mode 260 (W) x 495 (D) x 460 (H) mm / 22 kg at NT standard mode 10.2 (W) x 19.5 (D) x 19.9 (H)" / 48 lbs. at ARK standard mode 10.2 (W) x 19.5 (D) x 18.1 (H)" / 48 lbs. at NT standard mode

1.3. Ašių matavimo ribos
1.4. Tyrimui atlikti pakankamas vyzdžio diametras

2.1. Matuojamo ragenos gaubtumo spindulio ilgio ribos

2.2. Ašių matavimo ribos

3.1. Akies spaudimo matavimo ribos

4.1. Ragenos storio matavimo ribos

4.2. Akispūdžio matavimo rezultatų perskaičiavimas, atsižvelgiant į ragenos storį

3.2. Tonometrijos matavimo koordinatijų nustatymas

6. Reikalavimai ekranui

2.3. Ragenos diametro matavimas

* Only for the countries (regions) certified by the Radio Law

7. Rezultatų spausdinimas

8. Elektros maitinimas

Product/Model name: AUTO REF/KERATO/TONO/PACHYMETER TONOREF III
Brochure and listed features of the device are intended for non-US practitioners.
Specifications may vary depending on circumstances in each country.
Specifications and design are subject to change without notice.



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Parameter item	Setting contents
[WORKING D.]	35 to 70 cm (5 cm increments) (Default setting: 40 cm) 14 to 28 inch (2 inch increments) The indication of [WD Unit] is toggled between [cm] and [inch]. Sets the near working distance referred to for calculation of near PD. The setting is also used as the near working distance for the vision comparison function.
[RETRO IMAGE PRINT]	[YES] / [NO] Sets whether to print the retroillumination image.
[ACC GRAPH PRINT]	[YES] / [NO] Sets whether to print the accommodation graph.
[CL Settings]	Up to 10 contact lens data items (No. 1 to No. 10) can be registered. Press the [CL Settings] button to display the lens setting screen for registration.  (page 114)
[CL List]	Displays lists of the registered contact lenses.  (page 115)

9. Energijos taupymas

○ [OTHER]

Parameter item	Setting contents
[WINDOW CHECK]	[DAY] / [YES] / [NO] Sets whether to automatically check the measuring window cleanliness. [DAY]: The measuring window is checked at the first start-up of the day. [YES]: The measuring window is checked every start-up. [NO]: The measuring window is not checked.
[TRACKING SW]	[NORMAL] / [ALL] Selects the type of the auto tracking function ([3D]/[2D]/OFF) and auto shot function (ON/OFF) by pressing  . [NORMAL]: Select from among [3D/ON], [3D/OFF], or [OFF/OFF]. [ALL]: Select from among [3D/ON], [3D/OFF], [2D/ON], [2D/OFF], [OFF/ON], or [OFF/OFF].
[SLEEP]	[NO] / [5MIN] / [10MIN] / [15MIN] Selects the length of idle time for the device to automatically display the initial screen (auto-sleep function).
[BEEP]	[NO] / [LOW] / [HIGH] Selects the pitch of the beep (electronic sound) produced during measurement or such.
[LCD BRIGHTNESS]	[LOW] / [MEDIUM] / [HIGH] Sets the brightness of the LCD.
[PRESSURE CHECK]	[DAY] / [YES] / [NO] Sets whether to automatically check the puffed air pressure during tonometry. [DAY]: The puffed air pressure is checked at the first start-up of the day. [YES]: The puffed air pressure is checked every start-up. [NO]: The puffed air pressure is not checked.