



Auto Ref/Keratometer **ARK-1s/1a/1**

Auto Refractometer **AR-1s/1a/1**



THE ART OF EYE CARE



The Superior Auto and Auto

What is the superior auto
The ARK-1/AR-1 series speaks for itself,
and auto refractometer with
generating greater accuracy

Superior Functions

- ✓ *Accurate* Refraction Measurement
- ✓ *Simple* Opacity Assessment

Model	VA measurement	Glare test	Vision comparison
ARK-1s/AR-1s	○	○	○
ARK-1a/AR-1a	×	×	○
ARK-1/AR-1	×	×	*

○: Available, ×: Not available

* Available with scenery chart for the ARK-1
Not available for the AR-1

Ref/Keratometer Refractometer

ref/keratometer and auto refractometer?
 surpassing conventional auto ref/keratometer
 technologically enhanced functions
 and greater clinical information.

for *Superior Outcomes*

- ✓ *Easy* VA Measurement with Glare Test
- ✓ *Patient-friendly* Accommodation Measurement

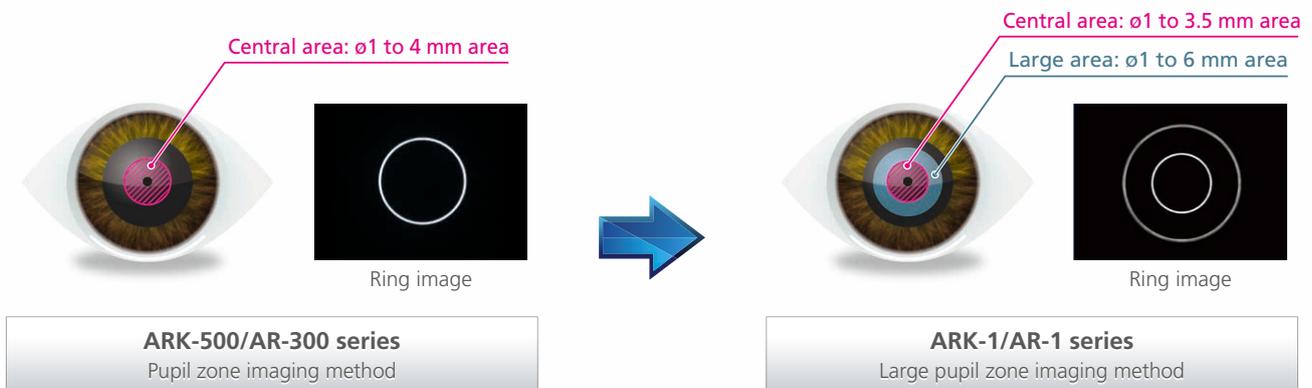
Accommodation measurement	Opacity assessment	Fog under astigmatism correction	Auto tracking
○	○	○	X-Y-Z directions
○	○	○	X-Y-Z directions
×	×	×	Y direction



Accurate Refraction Measurement

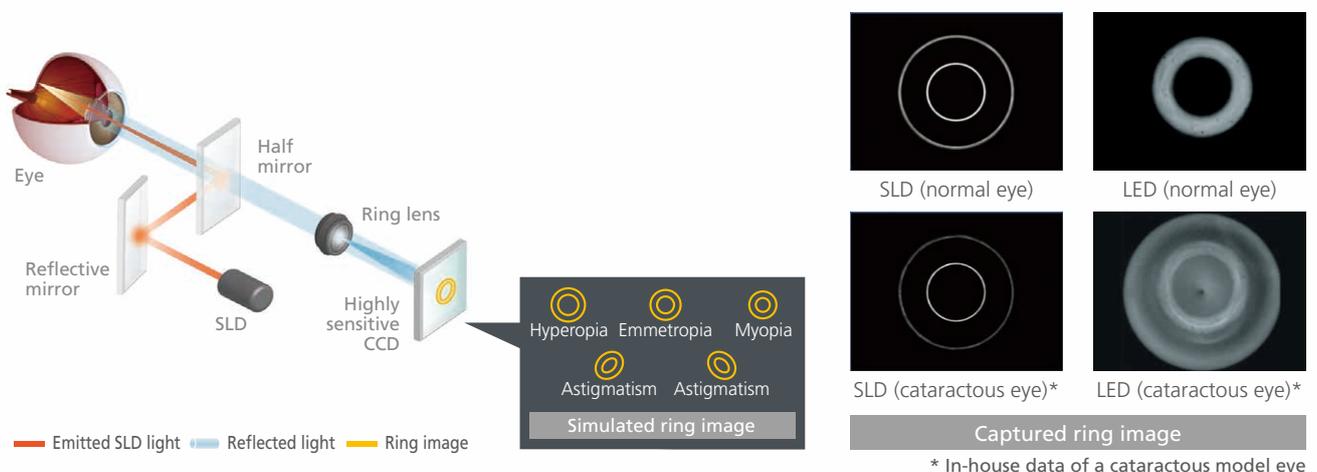
Large pupil zone imaging method

The large pupil zone imaging method enables the measurement of wider area refraction up to 6 mm diameter and can indicate the difference between the wide area refraction and central area refraction of up to 3.5 mm diameter. These pupil diameters are measured simultaneously. The difference of the measurement allows assessment of the effect of pupil size such as a vision in dim light.



Super luminescent diode and highly sensitive CCD

Incorporation of the super luminescent diode (SLD) provides a sharper and clearer image compared to a conventional LED. The highly sensitive CCD detects the ring image even if the fundus reflection is weak. The system, which combines the SLD and highly sensitive CCD, significantly improves measurement capability even in dense cataractous eyes.



Optimal fogging to minimize accommodation (available for the ARK-1s/1a and AR-1s/1a)

Fogging is performed after correcting the patient's astigmatism with built-in cylinder lenses. This allows the patient to view the target clearly and minimizes the interference with accommodation even in high astigmatism.

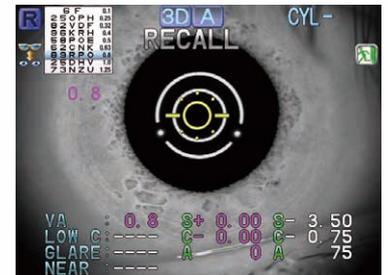
Easy VA Measurement with Glare Test

VA measurement with built-in charts and lenses (available for the ARK-1s and AR-1s)

The ARK-1s/AR-1s provides visual acuity (VA) measurement. This unique function enables a quick check of the patient's refractive error by comparing subjective measurement with objective measurement. Even corrected near visual acuity is measurable with easy operability to determine the need for a progressive lens.

Recall function for instant vision comparisons (available for the ARK-1s/1a/1 and AR-1s/1a)

The recall function provides the instant comparison between vision corrected with AR data and uncorrected vision or vision corrected with the data of patient's own glasses. For the patient, this function demonstrates the difference in vision and the necessity for more appropriate vision correction.



Distance vision corrected with AR data	Uncorrected distance vision
	Distance vision corrected with LM data*
Near vision corrected with AR data	Uncorrected near vision
	Near vision corrected with LM data*

Vision comparisons

*The data of patient's own glasses has to be imported from a NIDEK lensmeter.

Contrast and glare test (available for the ARK-1s and AR-1s)

After a low contrast VA chart is presented, a glare source is illuminated beside the chart and the glare VA can be measured. With this test the effect of glare and halo to visual performance can be measured. This utility can be used for cataract and refractive surgery patients.



Simulated patient's vision of low contrast VA chart



Vision with glare and halo



Normal vision

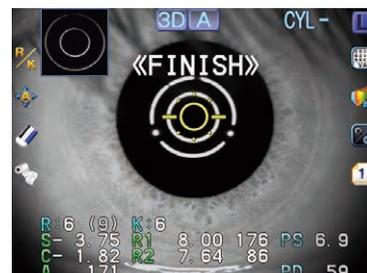
Simulated patient's vision of VA chart and glare source

Keratometry Measurement with Mire Ring (available for the ARK-1s/1a/1)

The mire ring is used to measure keratometry. It reduces eyelid artifacts.



Measurement with mire ring

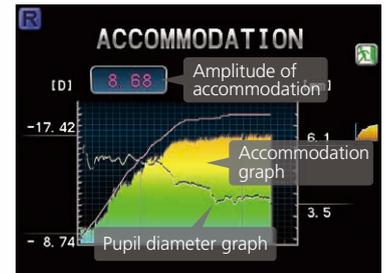


Patient-friendly Accommodation Measurement

(available for the ARK-1s/1a and AR-1s/1a)

Accommodation measurement with intelligence algorithm

Objective measurement of accommodation is performed with the patient focusing on a target that moves from distance to near. Intelligence algorithm detects the patient response and reduces the measurement time in cases with a slow or weak accommodative response. The accommodation measurement helps to assess pseudomyopia, eyestrain, and accommodative palsy.

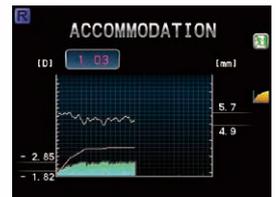
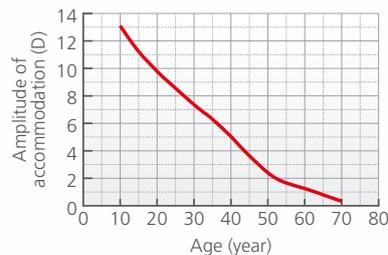


Measurement with astigmatism correction

Astigmatism is corrected with built-in cylinder lenses prior to measurement. It reduces the influence of astigmatism on the measurement of accommodation.

Assessment for intermediate or near vision lens

The assessment of accommodation based on the age-accommodation relation allows to suggest whether an intermediate or near lens is required.



Courtesy of Masayoshi Kajita, MD, PhD

The amplitudes of accommodation on the graph are values of subjective measurement. The amplitudes of accommodation of objective measurement tend to be lower than those on the graph.

Simple Opacity Assessment

(available for the ARK-1s/1a and AR-1s/1a)

Retroillumination image and NIDEK cataract indices

The retroillumination image enables the observation of opacity of the optical media of the eye. NIDEK cataract indices indicate the severity of the opacity and help to assess the progression of pathology.

COI.H	Opacity size within a diameter of 3 mm of the center (vertical diameter): mm
COI.A	Opacity proportion within a diameter of 3 mm of the center: %
POI	Opacity proportion within the entire periphery: %

Cataract indices

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.



Eye with dense opacity



Eye with light opacity

Practical and User-friendly Features

3D* auto tracking and auto shot

The 3D auto tracking and auto shot provide faster, simpler, and more accurate measurements. When alignment is performed correctly, measurement starts automatically.

*Y direction (vertical) auto tracking is available for the ARK-1 and AR-1.



Tiltable color LCD screen

The color LCD with tilt function offers easy operation even when the operator is standing.



High-speed printer with easy loading and auto cutter

The printer paper can be changed easily. The data sheet is cut by an auto cutter for quick and easy detachment.



Summary display and printout of measured values

Various measured values can be displayed simultaneously on the summary screen allowing easy and quick confirmation and printing.

SUMMARY	
ALL	ALL
AR 2.00	AR 1.75
S 0.00	S 0.25
A 0	A 6.8
L DATA	L DATA
S 2.00	S 2.00
C 0.25	C 0.25
A 87	A 81
L DIFF	L DIFF
S 0.00	S 0.25
C 0.25	C 0.00
A +87	A +13
PS 6.4	PS 6.7
PD 64	
N PD60	

ID 12345678901234567890		ACC 0.50	MIN- 1.75 MAX- 2.25
NAME		(PS MIN 4.6 MAX 5.5)	
FEB/28/2013 16:10		RETRO	
VD=12.00mm		COI: H 0.1mm	
WD=40cm		COI: A 5%	
REF. INDEX =1.3375		POI 23%	
<R>	S C A	COI: S	
- 1.75 - 0.50 173.9		COI: A	
- 1.25 - 1.00 177.9		POI	
- 1.25 - 1.00 5.8			
<- 1.25 - 1.00 177.9			
<- 2.00 SE			
TL - 1.25 - 1.00 177			
CL - 1.25 - 1.00 177			
- 1.75 SE			
L DATA			
- 1.50 - 1.00 177			
PS 4.5			
		<L> S C A	
		- 1.25 - 1.00 177.9	

Quick and easy data transfer

The ARK-1/AR-1 series has simple interfaces such as LAN and RS-232C for seamless data communication with multiple devices. An optional Eye Care card is also available for wireless data transfer to enhance productivity.



ARK-1/AR-1 Series Specifications

Model	ARK-1s/AR-1s	ARK-1a/AR-1a	ARK-1/AR-1
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		
Auto keratometer*1 Measurement range	Curvature radius 5.00 to 13.00 mm (0.01 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)	←	←
Sagittal measurement	25° each from the center (superior side, inferior side, temporal side, nasal side)		
VA measurement Measurement mode	Uncorrected VA, Corrected VA (distance, near)		
Measurement range	Less than 0.1, 0.1, 0.25, 0.32, 0.4, 0.5, 0.63, 0.8, 1.0, 1.25 or Less than 20/200, 20/200, 20/80, 20/60, 20/50, 20/40, 20/30, 20/25, 20/20, 20/16	Not available	Not available
Correction range	Sphere -20.00 to +20.00 D (VD = 12 mm) (0.25 D increments) Cylinder 0 to ±8.00 D (0.25 D increments) Axis 0 to 180° (1°/5° increments)		
Vision comparison	Available with VA chart	Available with scenery chart	Available*2 / Not available*3
Retroillumination image	Available	←	Not available
Accommodation measurement range	0 to 10.00 D (0.01/0.12/0.25 D increments)	←	Not available
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*1	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	←	Y direction
Auto shot	Available	←	←
Display	Tilttable 6.5-inch color LCD	←	←
Printer	Thermal line printer with easy loading and auto cutter	←	←
Interface	RS-232C: 2 ports USB, LAN: 1 port each	←	←
Power supply	100 to 240 V AC, 50/60 Hz	←	←
Power consumption	100 VA	←	←
Dimensions/mass	260 (W) x 495 (D) x 457 (H) mm / 20 kg 10.2 (W) x 19.5 (D) x 18.0 (H)" / 44 lbs.	←	←
Standard accessories	Printer paper, Power cord, Dust cover, Chinrest paper, Fixing pins for chinrest paper, Spherical model eye with integrated contact lens holder*4	←	←
Optional accessories	Eye Care card, Barcode scanner, Magnetic card reader, Communication cable (RS-232C)	←	←

*1 Available for the ARK-1s, ARK-1a, and ARK-1

*2 Available with scenery chart for the ARK-1

*3 Not available for the AR-1

*4 The integrated contact lens holder is used only with the ARK-1s, ARK-1a, and ARK-1.

Product/model name: AUTO REF/KERATOMETER ARK-1/ARK-1a/ARK-1s
AUTO REFRACTOMETER AR-1/AR-1a/AR-1s

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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[Manufacturer]