



Refractive index measurement for laboratories and the industry

Features

- The KERN ORA refractometers are universal, maintenance free analogue handheld refractometers.
- The handy and robust design allows the easy, efficient and sustainable use in everyday life.
- Manually calculated conversions and errors of the user are avoided by multiple selectable scales.
- These scales are especially developed, exactly calculated and checked. They are also characterized by their thin and clear lines.
- The optical system and the prism cover are made of special material which allows a low-tolerance measuring.
- All ORA models are equipped with an eyepiece for easy and smooth setting for many different diopter strengths.
- The models marked with "ATC" have an automatic temperature compensation which enables accurate measurement at different ambient temperatures (10 °C to 30 °C).
- The following accessory-parts are included:
 - Storage box
 - Calibration liquid
 - Calibration block (if required)
 - Pipette
 - Small screwdriver
 - Cleaning tissue
- Further accessories are available optionally.

Technical data

- Die-cast housing of copper-aluminium alloy, chrome coated
- Measurement temperature without ATC: 20 °C
- Measurement temperature range with ATC: 10 °C – 30 °C
- Packing dimensions W×D×H 215×94×65 mm (depending on the model)
- Dimensions of the box: 205×75×55 mm (depending on the model)
- Product length: approx. 130 – 200 mm (depending on the model)
- Net weight approx. 135 – 600 g (depending on the model)

STANDARD



OPTION



Scope of application: Sugar

The following models are particularly suitable for the measurement of the “BRIX” value. They are used to determine the sugar content in food, especially in fruit, vegetables, juice and soft drinks. In the same ideal way these refractometers serve for monitoring processes in the industry (coolant monitoring, oils, lubricants and fats).

The main scope of applications is:

- Industry: Monitoring of lubricants for process and quality control
- Food industry: Beverages, fruits and sweets
- Agriculture: Determination of the degree of ripeness of fruits for quality control in harvesting
- Restaurants and large-scale catering establishment



Model	Scales	Measuring range	Division	ATC	
KERN					
ORA 10BB	Brix	0 - 10 %	0,1 %		
ORA 10BA	Brix	0 - 10 %	0,1 %	✓	
ORA 18BB	Brix	0 - 18 %	0,1 %		
ORA 20BB	Brix	0 - 20 %	0,1 %		
ORA 20BA	Brix	0 - 20 %	0,1 %	✓	
ORA 32BB	Brix	0 - 32 %	0,2 %		
ORA 32BA	Brix	0 - 32 %	0,2 %	✓	
ORA 62BB	Brix	28 - 62 %	0,2 %		
ORA 62BA	Brix	28 - 62 %	0,2 %	✓	
ORA 82BB	Brix	45 - 82 %	0,5 %		
ORA 80BB	Brix	0 - 80 %	0,5 %		

Scope of application: Honey

The following models are particularly suitable for the measurement of the “BRIX” value, as well as the water content in honey and “degrees Baumé” to determine the relative density of liquids.

The main scope of applications is:

- Beekeeping
- Honey production



Model	Scales	Measuring range	Division	ATC	
KERN					
ORA 3HB	Brix Baumé Water content	58 - 92 % 38 - 43 °Bé 12 - 27 %	0,5 % 0,5 °Bé 1 %		
ORA 3HA	Brix Baumé Water content	58 - 92 % 38 - 43 °Bé 12 - 27 %	0,5 % 0,5 °Bé 1 %	✓	
ORA 6HB	Water content	12 - 30 %	0,1 %		
ORA 6HA	Water content	12 - 30 %	0,1 %	✓	

Scope of application: Salt

The following models are particularly suitable for the measurement and concentration control of the mass fraction of sodium chloride in water as well as of the content of NaCl (salt) in water. This is often used in the preparation and the cooking of sauces, bases for pastries, the production of brines (e.g. for white cheese) and the preparation of seafood and marinades for meat.

The main scope of applications is:

- Food industry
- Restaurants and large-scale catering establishment
- Aquaristic: Fishkeepers/Fishfarmers in sea and sweetwater



Model	Scales	Measuring range	Division	ATC	
KERN					
ORA 1SB	Salinity specific gravity	0 – 100 ‰ 1,000 – 1,070 sg	1 ‰ 0,001 sg		
ORA 1SA	Salinity specific gravity	0 – 100 ‰ 1,000 – 1,070 sg	1 ‰ 0,001 sg	✓	
ORA 2SB	Salt (NaCl)	0 – 28 %	0,2 %		
ORA 2SA	Salt (NaCl)	0 – 28 %	0,2 %	✓	
ORA 3SB	Salt (NaCl) Brix	0 – 28 % 0 – 32 %	0,2 % 0,2 %		
ORA 3SA	Salt (NaCl) Brix	0 – 28 % 0 – 32 %	0,2 % 0,2 %	✓	

Scope of application: Wine

The following models are particularly suitable for the measurement of the content of sugar in fruits. It indicates the expected °Alcohol of the fruit. The degree of ripeness of fruit (fruit-sugar) can also be determined, such as e.g. grapes.

The main scope of applications is:

- Agriculture: Wine-growing and fruit-growing
- Wine-production
- Must and alcohol production



°Oe = Degree Oechsle, °KMW = Klosterneuburger Must balance

Model	Scales	Measuring range	Division	ATC	
KERN					
ORA 1WB	Oechsle KMW (Babo) Brix	0 – 140 °Oe 0 – 25 °KMW 0 – 32 %	1 °Oe 0,25 °KMW 0,2 %		
ORA 1WA	Oechsle KMW (Babo) Brix	0 – 140 °Oe 0 – 25 °KMW 0 – 32 %	1 °Oe 0,25 °KMW 0,2 %	✓	
ORA 3WB	Oechsle Brix	30 – 140 °Oe 0 – 32 %	1 °Oe 0,2 %		
ORA 3WA	Oechsle Brix	30 – 140 °Oe 0 – 32 %	1 °Oe 0,2 %	✓	
ORA 7WB	Oechsle KMW (Babo) Brix	30 – 140 °Oe 0 – 25 °KMW 0 – 32 %	1 °Oe 0,2 °KMW 0,2 %		
ORA 7WA	Oechsle KMW (Babo) Brix	30 – 140 °Oe 0 – 25 °KMW 0 – 32 %	1 °Oe 0,2 °KMW 0,2 %	✓	
ORA 2AB	Vol (weight) Vol (weight)	0 – 50 % Vol 50 – 80 % Vol	1 % Vol 2,5 % Vol		

Scope of application: Urine

The following models are particularly suitable for the measurement of the specific gravity (sg) in urine, the quantity of serum (serumproteine) in urine (doping control among athletes), and the refractive index.

The main scope of applications is:

- Hospitals
- Doctor's surgeries/Physicians
- Medical training institutions
- Nursing homes
- Sports medicine (doping test)
- Veterinary



Model	Scales	Measuring range	Division	ATC	
KERN					
ORA 2PB	Serum protein Urine (spec. gravity) Refractive index	0 - 12 g/dl 1,000 - 1,050 sgU 1,3330 - 1,3600 nD	0,2 g/dl 0,002 sgU 0,0005 nD		
ORA 2PA	Serum protein Urine (spec. gravity) Refractive index	0 - 12 g/dl 1,000 - 1,050 sgU 1,3330 - 1,3600 nD	0,2 g/dl 0,002 sgU 0,0005 nD	✓	
ORA 5PB <small>NEW</small>	Serum protein Urine (s. g. dog) Urine (s. g. cat)	2 - 14 g/dl 1,000 - 1,060 sgU 1,000 - 1,060 sgU	0,1 g/dl 0,001 sgU 0,001 sgU		

NEW New model

Scope of application: Industry/Automotive

The following models are particularly suitable for the measurement and determination of AdBlue, glycol concentration (ethylene EG, propylene PG), battery fluid (BF), urea, the freezing point of fountain solution (CW) and the refractive index. Furthermore these models are suitable for the measurement of thermal exchange systems.

The main scope of applications is:

- Automotive industry: Car-workshops and producers
- Chemical industry
- Solar industry: Antifreeze monitoring
- Geothermal industry: Brine-concentration-measurement for ground heat
- Forestry/Lumbermen



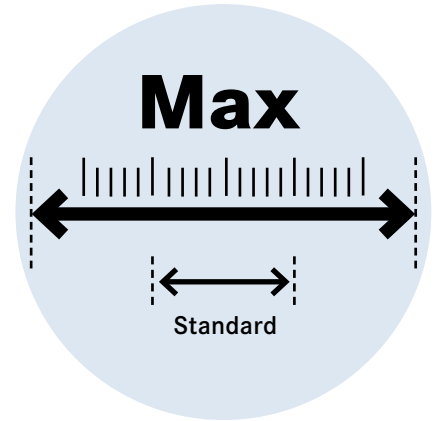
Model	Scales	Measuring range	Division	ATC	
KERN					
ORA 4FB	EG (G11/12) PG (G13) CW BF	-50 - 0 °C -50 - 0 °C -40 - 0 °C 1,10 - 1,40 kg/l	1 °C 1 °C 5 °C 0,01 kg/l		
ORA 4FA	EG (G11/12) PG (G13) CW BF	-50 - 0 °C -50 - 0 °C -40 - 0 °C 1,10 - 1,40 kg/l	1 °C 1 °C 5 °C 0,01 kg/l	✓	
ORA 1UB	Urea	0 - 40 %	0,2 %		
ORA 1UA	Urea	0 - 40 %	0,2 %	✓	
ORA 4UB	Urea EG (G11/12) PG (G13) CW BF	30 - 35 % -50 - 0 °C -50 - 0 °C -40 - 0 °C 1,10 - 1,40 kg/l	0,2 % 1 °C 1 °C 5 °C 0,01 kg/l		
ORA 4UA	Urea EG (G11/12) PG (G13) CW BF	30 - 35 % -50 - 0 °C -50 - 0 °C -40 - 0 °C 1,10 - 1,40 kg/l	0,2 % 1 °C 1 °C 5 °C 0,01 kg/l	✓	

Scope of application: Expert applications

The following models have a special large measuring range for the refractive index and large divided scales for the measurement and clear reading of Brix values.

The main scope of applications is:

- Universal application, especially when extra large measuring ranges are required



Model	Scales	Measuring range	Division	ATC	
KERN					
ORA 80BE	Brix	0 – 50 % 50 – 80 %	0,5 % 0,5 %		
ORA 90BE	Brix	0 – 42 % 42 – 71 % 71 – 90 %	0,2 % 0,2 % 0,2 %		
ORA 1RE	Refractive index	1,333 – 1,405 nD 1,405 – 1,468 nD 1,468 – 1,517 nD	0,005 nD 0,005 nD 0,005 nD		
ORA 4RR	Refractive index	1,440 – 1,520 nD	0,001 nD		



ORA 4RR



ORA 90 BE/ORA 1RE



ORA 80BE

Scope of application: Gemmology/Jewellery

The Gem models have a special refracting-index range for jewellery. For this refractometer there is a nice leather bag in the scope of delivery included.

The main scope of applications is:

- Jewellers
- Training/Education
- Jewellery industry



Model	Scales	Measuring range	Division	ATC	
KERN					
ORA 1GG	Refractive index	1,30 – 1,81 nD	0,01 nD		



ORA 1GG



Accessory parts: Analogue refractometer – ORA



Prism coverplate with LED
ORA-A1101



Calibration liquid/
Contact liquid



Leather bag
ORA-A2103



































Calibration block

Model	Description	
KERN		
ORA-A1101	Prism coverplate with integrated LED illumination	
ORA-A2103	Leather bag for analog refractometers	
ORA-A1001	Calibration liquid – distilled water Volume: 2,5 ml	
ORA-A1002	Contact liquid – Clove oil (for Calibration value 19,6%) Volume: 2,5 ml	
ORA-A1003	Calibration liquid – saturated salt solution Volume: 2,5 ml	
ORA-A1004	Contact liquid – Clove oil (for Calibration value 78,8%) Volume: 2,5 ml	
ORA-A1005	Calibration block for models ORA 82BB, ORA 3HA, ORA 3HB, ORA 6HA, ORA 6HB , ORA 4RR	
ORA-A1107	Contact liquid – Alpha-Bromnaphthalene Volume: 2,5 ml	
ORA-A1008	Calibration block for model ORA 1GG	
ORA-2001	Prism coverplate (spare part)	

Relationship overview – refractometer calibration (analogue)

Model refractometer	Calibration value	Calibration liquid	Article number liquid	Calibration block	Article number block
ORA 10BA; ORA 10BB; ORA 18BB; ORA 1RE; ORA 1SA; ORA 1SB; ORA 1UA; ORA 1UB; ORA 1WA; ORA 1WB; ORA 20BA; ORA 20BB; ORA 2AB; ORA 2PA; ORA 2PB; ORA 2SA; ORA 2SB; ORA 32BA; ORA 32BB; ORA 3SA; ORA 3SB; ORA 3WA; ORA 3WB; ORA 4FA; ORA 4FB; ORA 4UA; ORA 4UB; ORA 5PB; ORA 7WA; ORA 7WB; ORA 80BB; ORA 80BE; ORA 90BE	0 % Brix	distilled water	ORA-A1001	-	-
ORA 62BA; ORA 62BB	29,6 % Brix	saturated salt solution	ORA-A1003	-	-
ORA 3HA; ORA 3HB; ORA 82BB	78,8 % Brix	Clove oil CAS 8000-34-8	ORA-A1004	yes	ORA-A1005
ORA 4RR	1,4875 nD	Clove oil CAS 8000-34-8	ORA-A1004	yes	ORA-A1005
ORA 6HA; ORA 6HB	19,6 % Brix	Clove oil CAS 8000-34-8	ORA-A1002	yes	ORA-A1005
ORA 1GG	1,515 nD	Alpha-Bromnaphthalene CAS 90-11-9	ORA-A1107	yes	ORA-A1008

 360°	360° rotatable microscope head	 FL-LED	Fluorescence illumination for compound microscopes With 3 W LED illumination and filter	 SD	SD card For data storage
 MONO	Monocular Microscope For the inspection with one eye	 PH	Phase contrast unit For a higher contrast	 SOFTWARE	PC software To transfer the measurements from the device to a PC.
 BINO	Binocular Microscope For the inspection with both eyes	 DF	Darkfield condenser/unit For a higher contrast due to indirect illumination	 AUTO ATC	Automatic temperature compensation For measurements between 10 °C and 30 °C
 TRINO	Trinocular Microscope For the inspection with both eyes and the additional option for the connection of a camera	 POLAR	Polarising unit To polarise the light	 IP	Protection against dust and water splashes IPxx The type of protection is shown by the pictogram.
 ABBE	Abbe Condenser With high numerical aperture for the concentration and the focusing of light	 INFINITY	Infinity system Infinity corrected optical system	 BATT	Battery operation Ready for battery operation. The battery type is specified for each device.
 HAL	Halogen illumination For pictures bright and rich in contrast	 ZOOM	Zoom magnification For stereomicroscopes	 RECHARGE	Battery operation rechargeable Prepared for a rechargeable battery operation
 LED	LED illumination Cold, energy saving and especially long-life illumination	 PARALLEL	Parallel optical system For stereomicroscopes, enables fatigue-proof working	 230 V	Mains adapter 230V/50Hz in standard version for EU. On request GB, AUS or USA version.
 IL	Incident illumination For non-transparent objects	 SCALE	Integrated scale In the eyepiece	 230 V	Power supply Integrated in balance. 230V/50Hz standard EU. More standards e.g. GB, AUS or USA on request.
 TL	Transmitting illumination For transparent objects	 USB 2.0	Integrated USB 2.0 digital camera For direct transmitting of the picture to a PC	 1 DAY	Package shipment The time required to manufacture the product internally is shown in days in the pictogram.
 FL	Fluorescence illumination For stereomicroscopes	 USB 3.0	Integrated USB 3.0 digital camera For direct transmitting of the picture to a PC	 3 YEARS WARRANTY	Warranty The warranty period is shown in the pictogram.
 FL-HBO	Fluorescence illumination for compound microscopes With 100 W mercury lamp and filter	 HDMI	HDMI digital camera For direct transmitting of the picture to a display device		

Abbreviations

C-Mount	Adapter for the connection of a camera to a trinocular microscope	LWD	Long Working Distance	SWF	Super Wide Field (Field number at least Ø 23 mm for 10x eyepiece)
FPS	Frames per second	N.A.	Numerical Aperture	W.D.	Working Distance
H(S)WF	High (Super) Wide Field (Eyepiece with high eye point for wearers of glasses)	SLR Kamera	Single-Lens Reflex camera	WF	Wide Field (Field number up to Ø 22 mm for 10x eyepiece)

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