



Box with accessories

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:
 - Calibration liquid
 - Calibration block (if required)
 - Storage box
 - 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 WxDxH 215x94x65 mm (depending on the model)
- Dimensions of the box: 205x75x55 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)



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	●	

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



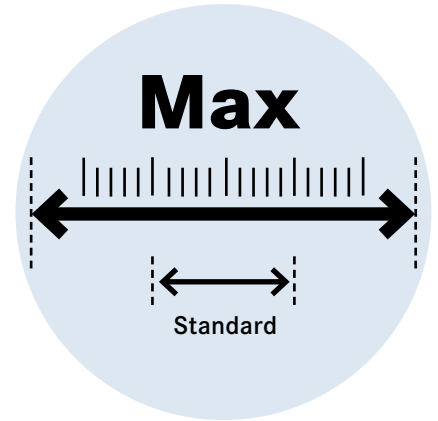
Model	Scales	Measuring range	Division	ATC	
KERN					
ORA 4FB	EG (G13) PG (G11 / 12) CW BF	-50 – 0 °C -50 – 0 °C -40 – 0 °C 1,10 – 1,40 kg / l	1 °C 1 °C 5 °C 0,01 kg / l		
ORA 4FA	EG (G13) PG (G11 / 12) CW BF	-50 – 0 °C -50 – 0 °C -40 – 0 °C 1,10 – 1,40 kg / l	1 °C 1 °C 5 °C 0,01 kg / l	●	
ORA 1UB	Urea	0 – 40 %	0,2 %		
ORA 1UA	Urea	0 – 40 %	0,2 %	●	
ORA 4UB	Urea EG (G13) PG (G11 / 12) 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 (G13) PG (G11 / 12) 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 90 BE / ORA 1RE



ORA 80 BE

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

Model	Description	
KERN		
ORA-A1101	Prism coverplate with integrated LED-Diode	
ORA-A2103	Leather bag for analog refractometers	
ORA-A1001	Calibration liquid 0% (Distilled Water) Volume: 2,5 ml	
ORA-A1002	Contact liquid 19,6 % for models ORA 6HB, ORA 6HA Volume: 2,5 ml	
ORA-A1003	Calibration liquid 29,6 % for models ORA 62BB Inhalt: 2,5 ml	
ORA-A1004	Contact liquid 78,8 % for models ORA 82BB, ORA 3HA, ORA 3HB, ORA 4RR Volume: 2,5 ml	
ORA-A1005	Calibration block for models ORA 82BB, ORA 3HA, ORA 3HB, ORA 6HA, ORA 6HB, ORA 4RR	
ORA-A1007	Contact liquid 2-Iodmethan for model ORA 1GG Volume: 2,5 ml	
ORA-A1008	Calibration block for model ORA 1GG	
ORA-2001	Prism coverplate (spare part)	



Prism coverplate with LED
ORA-A1101































Leather bag
ORA-A2103



Calibration liquid



Calibration block

 360°	360° rotatable microscope head	 FL-HB0	Fluorescence illumination for compound microscopes With 100 W mercury lamp and filter	 AUTO ATC	Automatic temperature compensation For measurements between 10 °C and 30 °C
 MONO	Monocular Microscope For the inspection with one eye	 FL-LED	Fluorescence illumination for compound microscopes With 3 W LED illumination and filter	 IP	Protection against dust and water splashes IPxx The type of protection is shown by the pictogram.
 BINO	Binocular Microscope For the inspection with both eyes	 PH	Phase contrast unit For a higher contrast	 BATT	Battery operation Ready for battery operation. The battery type is specified for each device.
 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	 ACCU	Rechargeable battery pack Rechargeable set.
 ABBE	Abbe Condenser With high numerical aperture for the concentration and the focusing of light	 INFINITY	Infinity system Infinity corrected optical system	 230 V	Mains adapter 230V/50Hz in standard version for EU. On request GB, AUS or USA version.
 HAL	Halogen illumination For pictures bright and rich in contrast	 ZOOM	Zoom magnification For stereomicroscopes	 230 V	Power supply Integrated in balance. 230V/50Hz standard EU. More standards e.g. GB, AUS or USA on request.
 LED	LED illumination Cold, energy saving and especially long-life illumination	 PARALLEL	Parallel optical system For stereomicroscopes, enables fatigue-proof working	 DAYS	Package shipment The time required to manufacture the product internally is shown in days in the pictogram.
 IL	Incident illumination For non-transparent objects	 SCALE	Integrated scale In the eyepiece	 3 YEARS WARRANTY	Warranty The warranty period is shown in the pictogram.
 TL	Transmitting illumination For transparent objects	 USB 2.0	Integrated USB 2.0 digital camera For direct transmitting of the picture to a PC		
 FL	Fluorescence illumination For stereomicroscopes	 USB 3.0	Integrated USB 3.0 digital camera For direct transmitting of the picture to a PC		

Abbreviations

C-Mount	Adapter for the connection of a camera to a trinocular microscope	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)
LWD	Long Working Distance	SWF	Super Wide Field (Field number at least Ø 23 mm for 10x eyepiece)		

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