

ANALOGUE REFRACTOMETERS – TYPE: HAND-HELD

PROFESSIONAL
MEASURING



2018

KERN Pictograms

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

Abbreviations

C-Mount	Adapter for the connection of a camera to a trinocular microscope
FPS	Frames per second
H(S)WF	High (Super) Wide Field (Eyepiece with high eye point for wearers of glasses)
LWD	Long Working Distance
N.A.	Numerical Aperture

SLR camera	Single-Lens Reflex camera
SWF	Super Wide Field (Field number at least Ø 23 mm for 10× eyepiece)
W.D.	Working Distance
WF	Wide Field (Field number up to Ø 22 mm for 10× eyepiece)

Why you should choose a KERN microscope now!

For over 170 years, KERN & SOHN has been synonymous with high precision weighing and measuring technology. This claim is the driving force for the development of our microscope and refractometer ranges.

By working closely with you and our production partners, within 3 years we have developed a complete product range of high-quality microscopes and refractometers.

Thanks to consistent customer focus paired with smart ideas and the latest available technology we are proud to be suppliers of high-quality, durable top microscopes and refractometers, which help you to be as efficient as possible in your daily work.

When developing our microscopes we have concentrated on the very best optical quality and have used only high-quality glass and the latest technologies to achieve this. The high-quality Philips halogen and modern LED illumination produce razor-sharp images with high contrast and which will impress you with their brilliant true-colour display – you must have noticed this yourself.

Your advantages:

- all mechanical parts have been designed for a long service life
- special attention has been given to the ergonomics of our microscopes, as this allows the user to work for several hours in a comfortable position which does not cause fatigue
- our microscopes are fully-equipped and can be used immediately
- Highlight for 2018: the KERN camera software – you will be amazed at how user-friendly and intuitive it is
- and much more...

Use our practical “Check list for microscopes and refractometers”, which may help you to quickly determine specifications for the future instrument. Together with our KERN product specialist you can choose the right product for you.

If there is no suitable product in the standard range, for example, then we will of course configure an individual microscope for you.

Our aim is to develop a market-driven product solution, so with our microscope and refractometer range, the saying holds true: good quality at a competitive price! This is what we stand for and work towards, every day!

With our current 2018 product range you can benefit from improved quality and a clear reduction in price, which we have been able to achieve through more efficient production methods and increased global sales of our microscopes and refractometers and of course we pass this straight on to you

Do you have any questions about our range of microscopes and refractometers?

Your KERN customer consultants are available at any time to help you further.

I hope that you enjoy working efficiently with our KERN Optics products.



Albert Sauter, Managing Director

Your advantages

fast

- 24 hour dispatch service for products in stock – order today, on its way tomorrow
- Sales & service hotline from 8:00 am to 5:00 pm

reliable

- Up to 3 years warranty
- Certified QM system
DIN EN ISO 9001

versatile

- One-stop shopping: from microscope through to refractometer – everything from one supplier
- Quick as a flash, find the product you want with the “Quick-Finder” at www.kern-sohn.com



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Our team of consultants will assist you
from Monday to Friday
from 8:00 am to 5:00 pm



www.kern-sohn.com
Information on current product availability, product data sheets, user instructions, useful knowledge, technical glossary and much for you to download, practical topic areas, which will guide you to the right product in your industry as well as a clever test weight and balance search engine.



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/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
- 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)



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	Price excl. of VAT ex works €
KERN					
ORA 10BB	Brix	0 – 10 %	0,1 %		80,-
ORA 10BA	Brix	0 – 10 %	0,1 %	✓	85,-
ORA 18BB	Brix	0 – 18 %	0,1 %		80,-
ORA 20BB	Brix	0 – 20 %	0,1 %		80,-
ORA 20BA	Brix	0 – 20 %	0,1 %	✓	85,-
ORA 32BB	Brix	0 – 32 %	0,2 %		80,-
ORA 32BA	Brix	0 – 32 %	0,2 %	✓	85,-
ORA 62BB	Brix	28 – 62 %	0,2 %		80,-
ORA 62BA	Brix	28 – 62 %	0,2 %	✓	85,-
ORA 82BB	Brix	45 – 82 %	0,5 %		80,-
ORA 80BB	Brix	0 – 80 %	0,5 %		80,-

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	Price excl. of VAT ex works €
KERN					
ORA 3HB	Brix Baumé Water content	58 – 92 % 38 – 43 °Bé 12 – 27 %	0,5 % 0,5 °Bé 1 %		85,-
ORA 3HA	Brix Baumé Water content	58 – 92 % 38 – 43 °Bé 12 – 27 %	0,5 % 0,5 °Bé 1 %	✓	90,-
ORA 6HB	Water content	12 – 30 %	0,1 %		95,-
ORA 6HA	Water content	12 – 30 %	0,1 %	✓	100,-



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	Price excl. of VAT ex works €
KERN					
ORA 1SB	Salinity specific gravity	0 – 100 ‰ 1,000 – 1,070 sg	1 ‰ 0,001 sg		80,-
ORA 1SA	Salinity specific gravity	0 – 100 ‰ 1,000 – 1,070 sg	1 ‰ 0,001 sg	✓	85,-
ORA 2SB	Salt (NaCl)	0 – 28 %	0,2 %		80,-
ORA 2SA	Salt (NaCl)	0 – 28 %	0,2 %	✓	85,-
ORA 3SB	Salt (NaCl) Brix	0 – 28 % 0 – 32 %	0,2 % 0,2 %		80,-
ORA 3SA	Salt (NaCl) Brix	0 – 28 % 0 – 32 %	0,2 % 0,2 %	✓	85,-

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	Price excl. of VAT ex works €
KERN					
ORA 1WB	Oechsle KMW (Babo) Brix	0 – 140 °Oe 0 – 25 °KMW 0 – 32 %	1 °Oe 0,25 °KMW 0,2 %		80,-
ORA 1WA	Oechsle KMW (Babo) Brix	0 – 140 °Oe 0 – 25 °KMW 0 – 32 %	1 °Oe 0,25 °KMW 0,2 %	✓	85,-
ORA 3WB	Oechsle Brix	30 – 140 °Oe 0 – 32 %	1 °Oe 0,2 %		80,-
ORA 3WA	Oechsle Brix	30 – 140 °Oe 0 – 32 %	1 °Oe 0,2 %	✓	85,-
ORA 7WB	Oechsle KMW (Babo) Brix	30 – 140 °Oe 0 – 25 °KMW 0 – 32 %	1 °Oe 0,2 °KMW 0,2 %		80,-
ORA 7WA	Oechsle KMW (Babo) Brix	30 – 140 °Oe 0 – 25 °KMW 0 – 32 %	1 °Oe 0,2 °KMW 0,2 %	✓	85,-
ORA 1AB NEW	Percentage by volume Percentage by volume	0 – 50 % (v/v) 50 – 80 % (v/v)	1 % (v/v) 2,5 % (v/v)		80,-
ORA 2AB	Percentage by mass Percentage by mass	0 – 50 % (w/w) 50 – 80 % (w/w)	1 % (w/w) 2,5 % (w/w)		80,-

NEW New model



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	Price excl. of VAT ex works €
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		80,-
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	✓	85,-
ORA 5PB	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		80,-

Scope of application: Industry/Automotive

The following models are particularly suitable for the measurement and determination of AdBlue, glycol concentration (ethylene (EG) and propylene (PG)), battery fluid (BF), urea, the freezing point of fountain solution (CW). 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	Price excl. of VAT ex works €
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		80,-
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	✓	85,-
ORA 1UB	Urea	0 – 40 %	0,2 %		80,-
ORA 1UA	Urea	0 – 40 %	0,2 %	✓	85,-
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		80,-
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	✓	85,-

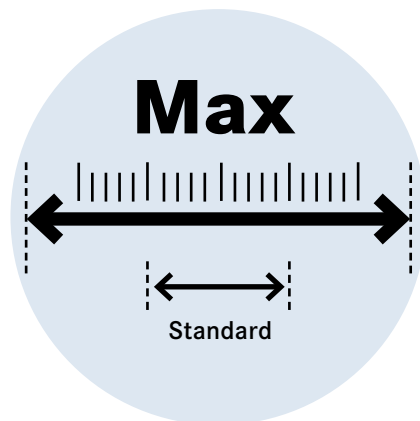
Scope of application: Expert applications

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	Price excl. of VAT ex works €
KERN					
ORA 80BE	Brix	0 – 50 % 50 – 80 %	0,5 % 0,5 %		140,-
ORA 90BE	Brix	0 – 42 % 42 – 71 % 71 – 90 %	0,2 % 0,2 % 0,2 %		315,-
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		320,-
ORA 4RR	Refractive index	1,440 – 1,520 nD	0,001 nD		85,-



ORA 4RR



ORA 90 BE/ORA 1RE



ORA 80BE

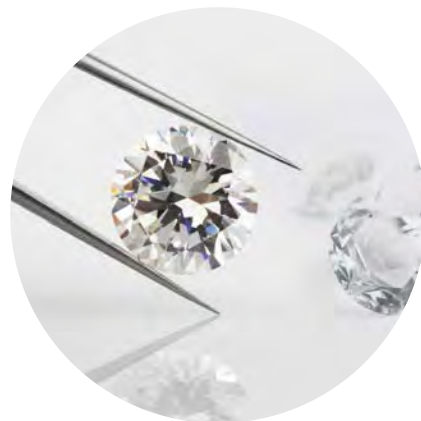
Scope of application: Gemmology/Jewellery

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	Price excl. of VAT ex works €
KERN					
ORA 1GG	Refractive index	1,30 – 1,81 nD	0,01 nD		225,-



ORA 1GG



Accessory parts: Analogue refractometer – ORA



Model	Description	Price excl. of VAT ex works €
KERN		
ORA-A1101	Prism coverplate with integrated LED illumination	19,-
ORA-A2103	Leather bag for analog refractometers	19,-
ORA-A1001	Calibration liquid – distilled water Volume: 2,5 ml	19,-
ORA-A1002	Contact liquid – Clove oil (for Calibration value 19,6%) Volume: 2,5 ml	19,-
ORA-A1003	Calibration liquid – saturated salt solution Volume: 2,5 ml	19,-
ORA-A1004	Contact liquid – Clove oil (for Calibration value 78,8%) Volume: 2,5 ml	19,-
ORA-A1005	Calibration block for models ORA 82BB, ORA 3HA, ORA 3HB, ORA 6HA, ORA 6HB , ORA 4RR	19,-
ORA-A1007	Contact liquid – Diiodomethane “Standard” (Refractive index: 1,74 nD) Volume: 2,5 ml	19,-
ORA-A3001	Contact liquid – Diiodomethane “Pro” (Refractive index: 1,79 nD) Volume: 2 ml	35,-
ORA-A1008	Calibration block for model ORA 1GG	19,-
ORA-A2001	Prism coverplate (spare part)	19,-

Price reduction

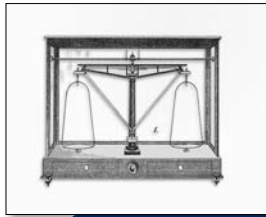
Relationship overview – refractometer calibration (analogue)

Model refractometer	Calibration value	Calibration liquid	Article number liquid	Calibration block	Article number calibration block
ORA 10BA; ORA 10BB; ORA 18BB; ORA 1WA; ORA 1WB; ORA 20BA; ORA 20BB; ORA 32BA; ORA 32BB; ORA 3SA; ORA 3SB; ORA 3WA; ORA 3WB; ORA 7WA; ORA 7WB; ORA 80BB; ORA 80BE	0 % Brix	distilled water	ORA-A1001	-	-
ORA 1UA; ORA 1UB	0 % Urea	distilled water	ORA-A1001	-	-
ORA 4FA; ORA 4FB; ORA 4UA; ORA 4UB	0 °C EG/PG/CW	distilled water		-	
ORA 1SA; ORA 1SB	0 ‰ Salinity	distilled water		-	
ORA 2SA; ORA 2SB	0 % Salt (NaCl)	distilled water		-	
ORA 2AB	0 % Vol (weight)	distilled water		-	
ORA 2PA; ORA 2PB; ORA 5PB	1,000 sg Urine	distilled water		-	
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 % Water content	Clove oil CAS 8000-34-8	ORA-A1002	yes	ORA-A1005
ORA 1GG	1,515 nD	Diiodomethane CAS 90-11-9	ORA-A1007	yes	ORA-A1008

KERN – Tradition and Innovation for over 170 years

An independent family business, KERN since already 8 generations is synonymous with quality and reliability in customer service.

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1844

KERN is founded – precision balances are produced



1863

A proud Gottlieb Kern with his staff



1880

Pharmaceutical balance with Aesculap



1923

Inflation – KERN wages are paid with self printed currency



1980

The electronic balance ousts mechanical devices



1994

Accredited DKD laboratory (ISO 17025)



2000

New premises in Balingen



2002

Existing QM system certification in accordance with DIN EN ISO 9001:2000 standards



2007

Approval for the manufacture of medical products (DIN EN 13485 and 93/42/EEC)



2008

Authorisation for initial verification by the manufacturer (2009/23/EC)



2009

Approval for the manufacture and sale of height rods (DIN EN 13485 and 93/42/EEC)



2012

Verification point for non-automatic balances and test weights.

New customer portal www.kern-sohn.com goes live



2014

Expansion of the product range to include optical instruments (microscopes and refractometers)



2015

Inauguration of Ziegelei 2.0 with computer-controlled high-bay warehouse



2017

Come with KERN into the digital future: Expansion of the model ranges compatible with Industry 4.0, as well as the related services

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