

## Digital refractometer KERN ORF



Transport and storage case



Rear view, screw-on battery compartment cover



IP65: Protected against dust and water splashes

## Digital refractive index measurement for laboratories and the industry for multi-application ► PREMIUM refractometer

### Features

- The KERN ORF refractometers are accurate and universal maintenance free digital handheld refractometers
- The large display is easy to read. Mistakes in reading are avoided
- The typical and practical design is suitable for a quick and convenient everyday use and is characterized by its easy-using and robustness
- The PREMIUM refractometers from the KERN ORF range are protected to international IP65 protection class, against dust and water splashes. After use, you can rinse the refractometer under running water
- The large, easy-to-read TFT colour display with integrated temperature display supports the user to reliably determine the measurement
- A large selection of models is available with single or multiple scales. This allows the use in various applications
- The instrument comes with an optimized software that can show a result in different scales
- The integrated automatic temperature compensation (ATC), avoids the manual conversion of the measurement. This allows a quick and efficient usage of the instrument
- Due to the fact that the refractometer has been calibrated at the factory, this guarantees that it can be used immediately for accurately measuring your sample.
- The following accessory-parts are included:
  - Calibration liquid
  - Pipette
  - Storage box
  - 2 × AAA batteries
  - Leather bag
  - Small screwdriver
  - Cleaning tissue

### Technical data

- Measurement temperature: 5 °C – 40 °C
- Overall dimensions W×D×H 145×67×40 mm
- Net weight approx. 200 g
- Power supply: 2 × AAA (1,5 V)
- Lifetime of the battery: approx. 3.750 measurements
- ATC (Automatic Temperature Compensation), does not apply to the refraction index scale
- Minimum sample volume: 2-3 drops
- Automatic energy management (AUTO-OFF after 90 seconds)

! Now also available with calibration certificate, see page 114!

### STANDARD



## Digital refractometer KERN ORF-B · ORF-H

### 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 sweet or soft drinks. In the same ideal way, these refractometers serve in monitoring processes in the industry (coolant monitoring, oils, lubricants and fats). Alternatively, the display can be switched to show the refractive index.

The main scope of applications is:

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



Model	Scales	Measuring range	Accuracy	Division	
<b>KERN</b>					
<b>ORF 45BM</b>	Brix Refractive index	0 – 45 % 1,3330 – 1,4098 nD	± 0,2 % ± 0,0003 nD	0,1 % 0,0001 nD	
<b>ORF 92BM</b>	Brix Refractive index	58 – 92 % 1,4370 – 1,5233 nD	± 0,2 % ± 0,0003 nD	0,1 % 0,0001 nD	
<b>ORF 85BM</b>	Brix Refractive index	0 – 85 % 1,3330 – 1,5100 nD	± 0,2 % ± 0,0003 nD	0,1 % 0,0001 nD	

### Scope of application: Honey

The following models are particularly suitable for the measurement of the “BRIX” value, the water content in honey according to the International Honey Commission (IHC2002) and “degrees Baumé” to determine the relative density of liquids. Alternatively the display can be switched to show the refractive index.

The main scope of applications is:

- Beekeeping
- Honey production



Model	Scales	Measuring range	Accuracy	Division	
<b>KERN</b>					
<b>ORF 92HM</b>	Brix Baumé Water content Refractive index	58 – 92 % 38 – 43 °Bé 13 – 25 % 1,4370 – 1,5233 nD	± 0,2 % ± 0,2 °Bé ± 0,2 % ± 0,0003 nD	0,1 % 0,1 °Bé 0,1 % 0,0001 nD	

Digital refractometer KERN ORF-S · ORF-W

## Scope of application: Salt

The following models are particularly suitable to determine the concentration of NaCl (salt) in water. This is often used for the preparation and for 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. Alternatively the display can be switched to show the refractive index.

The main scope of applications is:

- Food industry
- Restaurants, and large-scale catering establishment, canteens



Model	Scales	Measuring range	Accuracy	Division	
<b>KERN</b>					
<b>ORF 3SM</b>	Brix Salt (NaCl) Refractive index	0 - 45 % 0 - 28 % 1,3330 - 1,4100 nD	± 0,2 % ± 0,2 % ± 0,0003 nD	0,1 % 0,1 % 0,0001 nD	

## Scope of application: Wine

The following models are particularly suitable for the measurement of the sugar content in fruit. 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 (viticulture) and fruit-growing
- Wine-production
- Must and alcohol production



°Oe = Degree Oechsle, °KMW = Klosterneuburger Most Waage

Model	Scales	Measuring range	Accuracy	Division	
<b>KERN</b>					
<b>ORF 2WM</b>	Mass SW Vol. AP Oechsle KMW (Babo)	0 - 35 % 0 - 22 % 0 - 150 °Oe 0 - 25 °KMW	± 0,2 % ± 0,2 % ± 1 °Oe ± 0,2 °KMW	0,1 % 0,1 % 1 °Oe 0,1 °KMW	

Digital refractometer KERN ORF-P · ORF-U

## 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	Accuracy	Division	
<b>KERN</b>					
<b>ORF 1PM</b>	Serum protein Urine (spec. gravity) Refractive index	0 – 12 g/dl 1,000 – 1,050 sgU 1,3330 – 1,3900 nD	± 0,1 g/dl ± 0,001 sgU ± 0,0003 nD	0,1 g/dl 0,001 sgU 0,001 nD	

## 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	Accuracy	Division	
<b>KERN</b>					
<b>ORF 2UM</b>	EG PG BF CW	-50 – 0 °C -50 – 0 °C 1.00 – 1.50 kg/l -40 – 0 °C	± 0,5 °C ± 0,5 °C ± 0,01 kg/l ± 0,5 °C	0,1 °C 0,1 °C 0,01 kg/l 0,1 °C	
<b>ORF 5UM</b>	EG PG Urea CW	-50 – 0 °C -50 – 0 °C 0 – 40 % -40 – 0 °C	± 0,5 °C ± 0,5 °C ± 0,2 % ± 0,5 °C	0,1 °C 0,1 °C 0,1 % 0,1 °C	
<b>ORF 6US</b>	Urea Refractive index	0 – 40 % 1,3330 – 1,4100 nD	± 0,2 % ± 0,0003 nD	0,1 % 0,0001 nD	

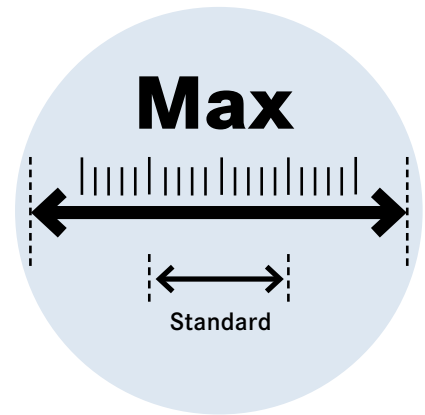
Digital refractometer KERN ORF-R

## Scope of application: Expert applications

The following model has a special large measuring range for the refractive index.

The main scope of applications is:

- Universal measuring instrument, especially for applications with extra large measuring ranges



Model	Scales	Measuring range	Accuracy	Division	
<b>KERN</b>					
<b>ORF 1RS</b>	Refractive index	1,3330 – 1,5400 nD	± 0,0005 nD	0,0001 nD	

## Accessory parts: Digital refractometer – ORF

Model	Description	
<b>KERN</b>		
<b>ORF-A1005</b>	Prism cover for digital refractometers	
<b>ORA-A1001</b>	Calibration liquid – distilled water Volume: 2,5 ml	
<b>ORA-A1006</b>	Calibration liquid – Triethyl citrate Volume: 2,5 ml	
<b>ORD-A2104</b>	Leather bag for digital refractometer (Spare part)	



Calibration liquid/  
Contact liquid

Relationship overview – refractometer calibration (digital)					
Model refractometer	Calibration value	Calibration liquid	Article number liquid	Calibration block	Article number calibration block
<b>ORF 45BM; ORF 85BM; ORF 3SM</b>	0 % Brix	distilled water	ORA-A 1001	–	–
<b>ORF 2WM</b>	0 °KMW	distilled water	ORA-A 1001	–	–
<b>ORF 1PM; ORF 1RS</b>	1,3330 nD	distilled water	ORA-A 1001	–	–
<b>ORF 2UM; ORF 5UM</b>	0 °C EG/PG/CW	distilled water	ORA-A 1001	–	–
<b>ORF 6US</b>	0 % Urea	distilled water	ORA-A 1001	–	–
<b>ORF 92BM; ORF 92HM</b>	60 % Brix	Triethyl citrate CAS 77-93-0	ORA-A 1006	–	–

## Pictograms

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

## Abbreviations

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

**Your KERN specialist dealer:**