



Transport and storage case



Battery compartment

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

### Features

- The KERN ORD refractometers are accurate and universal maintenance free digital handheld refractometers.
- The typical and practical design is suitable for a quick and convenient everyday use and is characterized by its easy-using and robustness.
- The large display is easy to read. Mistakes in reading are avoided.
- 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.
- The following accessory-parts are included:
  - Calibration liquid
  - Pipette
  - Storage box
  - 2 × AAA batteries
  - Leather bag
  - Small screwdriver
  - Cleaning tissue

### Technical data

- Measurement temperature: 10°C – 30°C
- Packing dimensions W×D×H 235×200×65 mm
- Overall dimensions W×D×H 133×65×38 mm
- Net weight approx. 200 g
- Power supply: 2 × AAA (1,5 V)
- Lifetime of the battery: 10000 measurements
- ATC (Automatic Temperature Compensation)
- Minimum sample volume: 2–3 drops
- Automatic energy management (turns off after 5 minutes)



**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>ORD 45BM</b> | Brix<br>Refractive index | 0 - 45 %<br>1,3330 - 1,4098 nD  | ± 0,2 %<br>± 0,0003 nD | 0,1 %<br>0,0001 nD |  |
| <b>ORD 92BM</b> | Brix<br>Refractive index | 58 - 92 %<br>1,4370 - 1,5233 nD | ± 0,2 %<br>± 0,0003 nD | 0,1 %<br>0,0001 nD |  |
| <b>ORD 85BM</b> | Brix<br>Refractive index | 0 - 85 %<br>1,3330 - 1,5100 nD  | ± 0,2 %<br>± 0,0003 nD | 0,1 %<br>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>ORD 92HM</b> | Brix<br>Baumé<br>Water content<br>Refractive index | 58 - 92 %<br>38 - 43 °Bé<br>13 - 25 %<br>1,4370 - 1,5233 nD | ± 0,2 %<br>± 0,1 °Bé<br>± 0,1 %<br>± 0,0003 nD | 0,1 %<br>0,1 °Bé<br>0,1 %<br>0,0001 nD |  |

**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>ORD 1SM</b> | Salt (NaCl)<br>Refractive index         | 0 - 28 %<br>1,3330 - 1,3900 nD             | ± 0,2 %<br>± 0,0003 nD            | 0,1 %<br>0,0001 nD          |  |
| <b>ORD 3SM</b> | Brix<br>Salt (NaCl)<br>Refractive index | 0 - 35 %<br>0 - 28 %<br>1,3330 - 1,3900 nD | ± 0,2 %<br>± 0,2 %<br>± 0,0003 nD | 0,1 %<br>0,1 %<br>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>ORD 2WM</b> | Mass SW<br>Vol. AP<br>Oechsle<br>KMW (Babo) | 0 - 35 %<br>0 - 22 %<br>30 - 150 °Oe<br>0 - 25 °KMW | ± 0,2 %<br>± 0,1 %<br>± 1 °Oe<br>± 0,1 °KMW | 0,1 %<br>0,1 %<br>1 °Oe<br>0,1 °KMW |  |

**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>ORD 1PM</b> | Serum protein<br>Urine (spec. gravity)<br>Refractive index | 0 - 12 g/dl<br>1,000 - 1,050 sgU<br>1,3330 - 1,3990 nD | ± 0,1 g/dl<br>± 0,001 sgU<br>± 0,0003 nD | 0,1 g/dl<br>0,001 sgU<br>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, 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



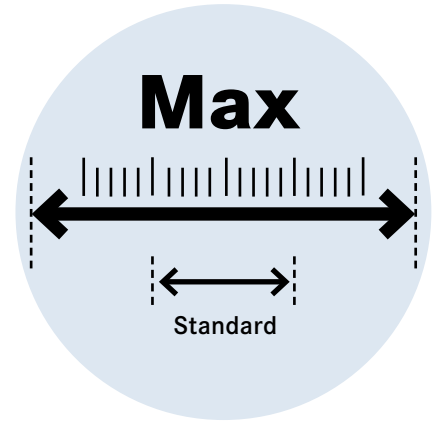
| Model          | Scales                 | Measuring range  | Accuracy  | Division                                |  |
|----------------|------------------------|--|---|---|--|
| <b>KERN</b>    |                        |  |   |   |  |
| <b>ORD 2UM</b> | EG<br>PG<br>BF<br>CW   | -50 - 0 °C<br>-50 - 0 °C<br>1.00 - 1.50 kg/l<br>-40 - 0 °C | ± 0,5 °C<br>± 0,5 °C<br>± 0,01 kg/l<br>± 0,5 °C | 0,1 °C<br>0,1 °C<br>0,01 kg/l<br>0,1 °C |  |
| <b>ORD 5UM</b> | EG<br>PG<br>Urea<br>CW | -50 - 0 °C<br>-50 - 0 °C<br>0 - 40 %<br>-40 - 0 °C         | ± 0,5 °C<br>± 0,5 °C<br>± 0,2 %<br>± 0,5 °C     | 0,1 °C<br>0,1 °C<br>0,1 %<br>0,1 °C     |  |
| <b>ORD 6US</b> | Urea                   | 0 - 40 %   | ± 0,2 %   | 0,1 %                                   |  |

**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>ORD 1RS</b> | Refractive index | 1,3330 - 1,5400 nD | ± 0,0003 nD | 0,0001 nD |  |

**Accessory parts: Digital refractometer – ORD**

| Model            | Description   |  |
|------------------|---|--|
| <b>KERN</b>      |   |  |
| <b>ORA-A1001</b> | Calibration liquid – distilled water<br>Volume: 2,5 ml  |  |
| <b>ORA-A1006</b> | Calibration liquid – Triethyl citrate<br>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 block |
| <b>ORD 45BM; ORD 85BM; ORD 1SM; ORD 3SM;<br/>ORD 2WM; ORD 1PM; ORD 1RS, ORD 2UM; ORD 5UM;<br/>ORD 6US</b> | 0 % Brix          | distilled water                 | ORA-A1001             | -                 | -                    |
| <b>ORD 1SM</b>  | 0 % Salt (NaCl)   | distilled water                 | ORA-A1001             | -                 | -                    |
| <b>ORD 2WM</b>  | 0 °KMW            | distilled water                 | ORA-A1001             | -                 | -                    |
| <b>ORD 1PM; ORD 1RS</b>   | 1,3330 nD         | distilled water                 | ORA-A1001             | -                 | -                    |
| <b>ORD 2UM; ORD 5UM</b>   | 0 °C EG/PG/CW     | distilled water                 | ORA-A1001             | -                 | -                    |
| <b>ORD 6US</b>  | 0 % Urea          | distilled water                 | ORA-A1001             | -                 | -                    |
| <b>ORD 92BM; ORD 92HM</b>   | 60 % Brix         | Triethyl citrate<br>CAS 77-93-0 | ORA-A1006             | -                 | -                    |

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

## 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 Kamera</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: