KERN® OPTICS

# Digital Refractometer

min.
READ
CAL
SCALE
KERN
OPTICS
Digital
Refractometer

# Operating Manual

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# Content

1. General information 3
2. Introduction 4
3. Display & operating buttons 5
4. Preparing before operating 6
5. Turn on & measure 6
6. Calibration 8
7. Changing scale & temperature unit 10
8. Turning off 11
9. Cleaning & maintenance 11
10. Disposal 11
11. Technical data 12
12. Error codes 12
13. Models and scales 13

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Carefully read through the operating manual even if you have prior experience with KERN refractometers.

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## 1.General information

### 1.1 Intended use

The refractometer is a measuring inst
for determining the refractive index of
transparent substances in liquid or in
cases also in the solid state. It is used
to observe the behaviour of light as it
from a prism with known properties
to the substance being tested.
Use of the refractometer for other pur
contrary to its intended use and
may be hazardous. The manufacturer
be liable for any damages caused by
improper use.

### 1.2 Warranty

The warranty shall be void in the even
‣Failure to observe the instructions in
operating manual
‣Use for purposes other than those d
‣Modifications or opening the device
‣Mechanical damage and/or damage
from media, liquids, natural wear and

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This digital refractometer cannot
any liquid that is highly corrosive
or glass. When measuring liquid
corrosive to plastics or react che
with plastics, be careful not to dr
measured liquid onto the shell.
it will corrode the shell.

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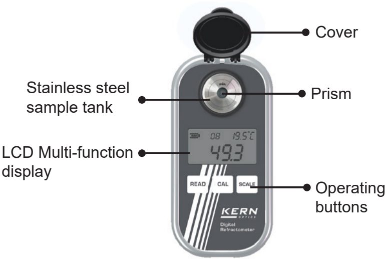
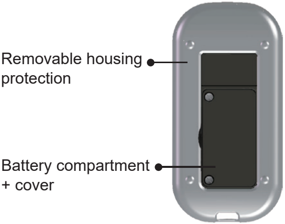
Otherwise

## 2. Introduction

### 2.1 Description



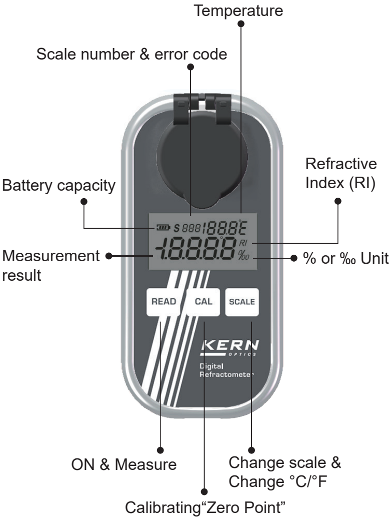


### 2.2 Scope of delivery

1x Strorage box | 1x Digital refractometer | 1x Operating manual | 1x AAA Battery 1.5 V | 1x Pipette | 1x Screwdriver

## 3. Display & operating buttons

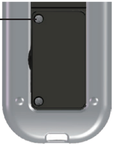
### 3.1 Description display & operating buttons



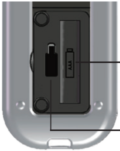
⚠ Note: Please replace the battery when the ▭ is displayed.

## 4. Preparing before operating

### 4.1 Install the battery



Turn the screw counterclockwise to open the battery hatch.

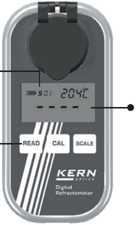


Put 1 piece of 1.5V battery into the cabin in the right way and recover the cabin again.

Only for KERN service staff

## 5. Turn on & measure

### 5.1 Turn on



The multi-function display shows the current scale number

Press "READ" to turn on the refractometer

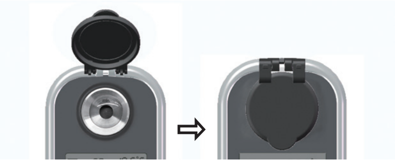
If there is no sample filled in, the display shows “- - - -"

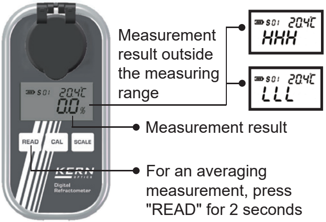
Note :

1. When used outdoors, please avoid strong light so
   as not to affect the measurement accuracy.
2. Please keep the instrument in a stable and still statement and position.

### 5.2 Measure

After turning on, clean the sample tank with distilled water and then dry it. Now fill the sample up to the mark, close the cover and press "READ".





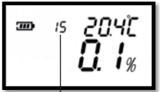
Measurement result outside the measuring range

Measurement result

For an averaging measurement, press "READ" for 2 seconds

### 5.3 Average value measurement

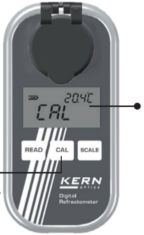
Press "READ" for 2 seconds. The dev
an automatic measurement series of 1
measurements and shows the averag
Afterwards, the device automatically t
to the normal measuring mode.



Remaining measurements

## 6. Calibration

The refractometer can only be calibra
distilled water. To do this, fill the samp
distilled water up to the mark and clos



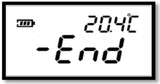
Press "CAL" for 2 seconds to enter calibration mode. Then press "CAL" again for 2-3 seconds until "CAL" flashes in the display.

ice starts
15
e value.
urns back

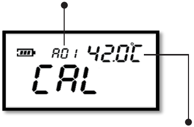
ted with
le tank with
se the cover.

LCD Flashing
Display

While "CAL" is flashing in the display, press "CAL" again to start the calibration. When the calibration is finished, the display shows "End". After approx. 10 seconds, the device automatically returns to normal mode.



If the calibration was not completed successfully, an error code appears in the display. Here, for example, A01.



Further error codes can be found in the appendix.

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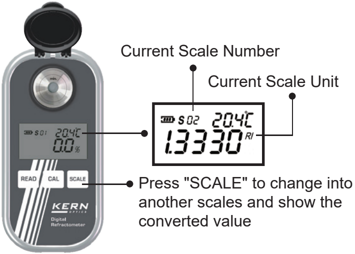
We recommend calibrating the refractometer,

- when commissioning
- after a strong shock
- after longer transport
- after a change of location with a large temperature difference
- if the device has not been used for a long time

Always use distilled water and make sure that the refractometer, the water and the environment are at the same temperature.

## 7. Changing scale & termperature unit

### 7.1 Changing scale

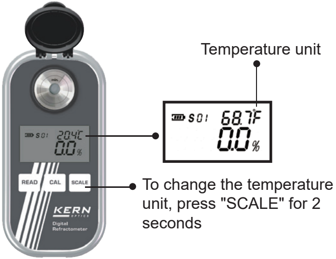


Current Scale Number

Current Scale Unit

Press "SCALE" to change into another scales and show the converted value

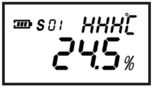
### 7.2 Changing termperature unit

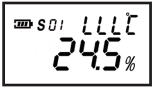


Temperature unit

To change the temperature unit, press "SCALE" for 2 seconds

If exceed the temperature limitations, the signs "HHH" or "LLL" would show.





## 8. Turning off

If without any operations for 1 minute,
the instrument would be automatically turned off.

## 9. Cleaning & maintenance

1. To avoid damages to the prism and the sample tank, clean them with distilled water after each use.
2. Dry it with a soft cloth afterwards.
3. Do not use hard or abrasive objects for cleaning.
4. Do not leave any residue in the sample tank.
5. If the refractometer is not going to be used for a longer time, remove the battery and store it at a cool and dry place.

## 10. Disposal

The packaging consists of environmentally friendly materials which can be disposed of via local recycling facilities.
The device and storage box should be disposed of by the operator in accordance with applicable national or regional regulations at the place of use.
NOTE: In accordance with the Battery Ordinance (BattV), batteries must not be disposed of in householdwaste. The end user is legally obliged to return them.

## 11. Technical data

| | |
|---|---|
| Scale + accuracy + resolution | Depents to the model |
| Temperature | 0,0 – 40,0 °C / 32,0 – 104,0 °F |
| Automatic Temperature Compensation | Yes |
| Minimum sample volume | 0.2 - 0.3 ml (Marking ring) |
| AUTO-OFF | 60 seconds |
| Averaging measurement | 15 measurements |
| Battery | 1 × AAA 1.5 V |
| Lifetime of the battery | Approx. 10.000 measurements |
| Overall dimensions L×W×H | 125×65×30 mm |
| Net weight | 140 g (without battery) |

## 12. Error codes

| code | Instructions |
|---|---|
| A01 | Beyond the scope of calibration temperature. (0.0℃~40.0℃) |
| A02 | During calibration, no solution or solution wrong. |
| A03 | This instrument has a hardware failure. |

## 13. Mo

| | Model |
|---|---|
| | ORM 50BM |
| | ORM 1RS |
| Fructose | ORM 1SU |
| | ORM 2SU |
| Honey | ORM 1HO |
| Salinity | ORM 1NA |
| | ORM 1SW |
| Alcohol | ORM 1AL |
| Beer | ORM 1BR |
| Wine | ORM 1WN |
| | ORM 2WN |
| Coffee | ORM 1CO |
| | ORM 2CO |
| Urine | ORM 1UN |
| | ORM 2UN |
| Car / Industry | ORM 1CA |
| | ORM 2CA |

## odels and scales

| Scale | No. | Range | Unit | Resolution | Accuracy |
|---|---|---|---|---|---|
| Brix | S01 | 0.0~50.0 | % | 0.1% | ±0.2% |
| Refractive Index | S02 | 1.3330~1.4200 | nD | 0.0001nD | ±0.0003nD |
| Brix | S01 | 0.0~90.0 | % | 0.1% | ±0.2% |
| Refractive Index | S02 | 1.330~1.5177 | nD | 0.0001nD | ±0.0003nD |
| Fructose | S01 | 0.0~68.9 | % | 0.1% | ±0.2% |
| Glucose | S02 | 0.0~59.9 | % | 0.1% | ±0.2% |
| Brix | S03 | 0.0~90.0 | % | 0.1% | ±0.2% |
| Refractive Index | S04 | 1.3330~1.5177 | nD | 0.0001nD | ±0.0003nD |
| Lactose | S01 | 0.0~16.5 | % | 0.1% | ±0.2% |
| Maltose | S02 | 0.0~15.6 | % | 0.1% | ±0.2% |
| Dextran | S03 | 0.0~10.6 | % | 0.1% | ±0.2% |
| Brix | S04 | 0.0~50.0 | % | 0.1% | ±0.2% |
| Honey Water | S01 | 5.0~38.0 | % | 0.1% | ±0.2% |
| Honey Baume | S02 | 33.0~48.0 | °Bé | 0.1 | ±0.2 |
| Brix | S03 | 0.0~90.0 | % | 0.1% | ±0.2% |
| Refractive Index | S04 | 1.3330~1.5177 | nD | 0.0001nD | ±0.0003nD |
| Salinity (NaCl) % | S01 | 0.0~28.0 | % | 0.1% | ±0.2% |
| Salinity (NaCl) ‰ | S02 | 0~280 | ‰ | 1‰ | ±2‰ |
| Specific Weight | S03 | 1.000~1.220 | - | 0.001 | ±0.002 |
| Brix | S04 | 0.0~50.0 | % | 0.1% | ±0.2% |
| Refractive Index | S05 | 1.3330~1.4200 | nD | 0.0001nD | ±0.0003nD |
| Salinity Seawater | S01 | 0~100 | ‰ | 1‰ | ±2‰ |
| Chlorinity Seawater | S02 | 0~57 | ‰ | 1‰ | ±2‰ |
| Specific Weight | S03 | 1.000~1.070 | - | 0.001 | ±0.002 |
| Brix | S04 | 0.0~50.0 | % | 0.1% | ±0.2% |
| Refractive Index | S05 | 1.3330~1.4200 | nD | 0.0001nD | ±0.0003nD |
| Alcohol Mass. | S01 | 0~72 | % | 1% | ±1% |
| Alcohol Vol. | S02 | 0~80 | % | 1% | ±1% |
| Brix | S03 | 0.0~50.0 | % | 0.1% | ±0.2% |
| Refractive Index | S04 | 1.3330~1.4200 | nD | 0.0001nD | ±0.0003nD |
| Plato | S01 | 0.0~30.5 | °P | 0.1 | ±0.3 |
| SG Wort | S02 | 1.000~1.130 | - | 0.001 | ±0.002 |
| Brix | S03 | 0.0~50.0 | % | 0.1% | ±0.2% |
| Refractive Index | S04 | 1.3330~1.4200 | nD | 0.0001nD | ±0.0003nD |
| Oechsle | S01 | 0~150 | °Oe | 1 | ±2 |
| Vol% | S02 | 0.0~22.0 | % | 0.1% | ±0.2% |
| KMW (Babo) | S03 | 0.0~25.0 | - | 0.1 | ±0.2 |
| Brix | S04 | 0.0~50.0 | % | 0.1% | ±0.2% |
| Oechsle France | S01 | 0~230 | °Oe | 1 | ±2 |
| Vol% | S02 | 0.0~22.0 | % | 0.1% | ±0.2% |
| KMW (Babo) | S03 | 0.0~25.0 | - | 0.1 | ±0.2 |
| Brix | S04 | 0.0~50.0 | % | 0.1% | ±0.2% |
| Coffee TDS 1 | S01 | 0.0~25.0 | - | 0.1 | ±0.2 |
| Brix | S02 | 0.0~50.0 | % | 0.1% | ±0.2% |
| Refractive Index | S03 | 1.3330~1.4200 | nD | 0.0001nD | ±0.0003nD |
| Coffee TDS 2 | S01 | 0.00~25.00 | - | 0.01 | ±0.20 |
| Brix | S02 | 0.00~30.00 | % | 0.01% | ±0.20% |
| Refractive Index | S03 | 1.3330~1.4200 | nD | 0.0001nD | ±0.0003nD |
| Urine Human | S01 | 1.000~1.050 | - | 0.001 | ±0.002 |
| Serum Protein | S02 | 0.0~12.0 | g/100ml | 0.1 | ±0.2 |
| Brix | S03 | 0.0~50.0 | % | 0.1% | ±0.2% |
| Refractive Index | S04 | 1.3330~1.4200 | nD | 0.0001nD | ±0.0003nD |
| Urine Cat | S01 | 1.000~1.060 | - | 0.001 | ±0.002 |
| Urine Dog | S02 | 1.000~1.060 | - | 0.001 | ±0.002 |
| Brix | S03 | 0.0~50.0 | % | 0.1% | ±0.2% |
| Refractive Index | S04 | 1.3330~1.4200 | nD | 0.0001nD | ±0.0003nD |
| Cleaner | S01 | (-60.0)~0.0 | °C | 0.1℃ | ±0.5℃ |
| AdBlue® | S02 | 0.0~51.0 | % | 0.1% | ±0.2% |
| Battery Fluid | S03 | 1.000~1.500 | - | 0.001 | ±0.005 |
| Brix | S04 | 0.0~50.0 | % | 0.1% | ±0.2% |
| Refractive Index | S05 | 1.3330~1.4200 | nD | 0.0001nD | ±0.0003nD |
| Ethylenglycol (%) | S01 | 0.0~100.0 | % | 0.1% | ±0.5% |
| Ethylenglycol (°C) | S02 | (-50.0)~0.0 | ℃ | 0.1℃ | ±0.5℃ |
| Propylenglycol (%) | S03 | 0.0~100.0 | % | 0.1% | ±0.5% |
| Propylenglycol (°C) | S04 | (-60.0)~0.0 | °C | 0.1℃ | ±0.5℃ |
| Brix | S05 | 0.0~90.0 | % | 0.1% | ±0.2% |

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