KERN® OPTICS

Digital Refractometer

READ
CAL
SCALE
KERN OPTICS
Digital Refractometer

Operating Manual

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

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 usec
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 ever
‣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 liquids
corrosive to plastics or react che
with plastics, be careful not to dr
measured liquid onto the shell. C
it will corrode the shell.

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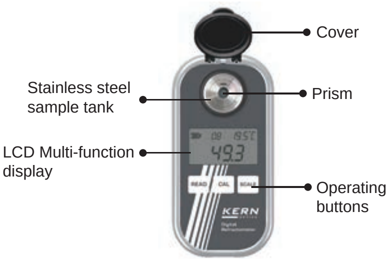
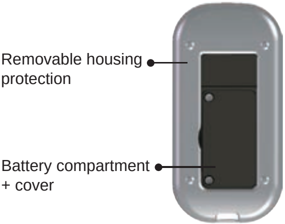
Otherwise

2. Introduction

2.1 Description



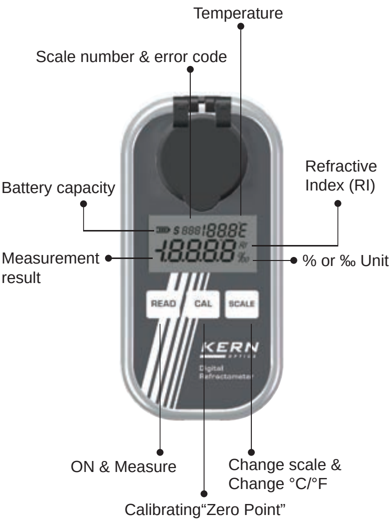


2.2 Scope of delivery

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

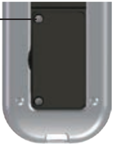


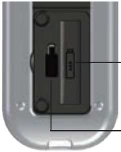
⚠ Note: Please replace the battery when the ▭ is displayed.

4. Preparing before operating

4.1 Install the battery

Turn the screw counterclockwise to open the battery hatch.



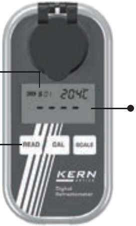


Put 1 piece of 1.5V battery into the cabin in the right way and recover the cabin again.

Only for KERN service staff

5. Turn on & measure

5.1 Turn on



The multi-function display shows the current scale number

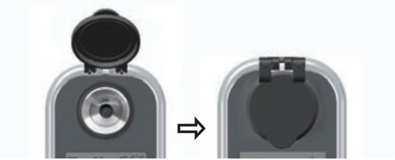
Press "READ" to turn on the refractometer

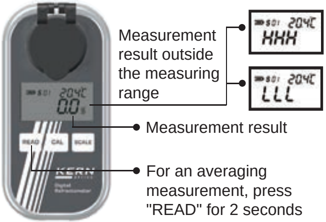
If there is no sample filled in, the display shows “- - - -"

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".





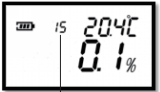
Measurement result outside the measuring range

Measurement result

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

5.3 Average value measurement

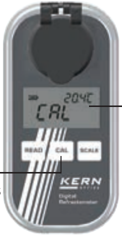
Press "READ" for 2 seconds. The
an automatic measurement series
measurements and shows the ave
Afterwards, the device automatical
to the normal measuring mode.



Remaining measurements

6. Calibration

The refractometer can only be cali
distilled water. To do this, fill the sa
distilled water up to the mark and



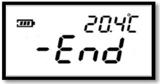
Press "CAL" for 2 seconds to enter calibration mode. Then press "CAL" again for 2-3 seconds until "CAL" flashes in the display.

device starts
of 15
rage value.
ly turns back

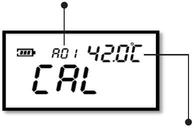
brated with
mple tank with
close the cover.

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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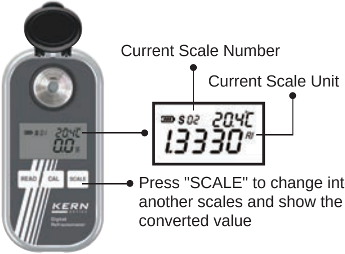
We recommend calibrating the refractometer,

- 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.

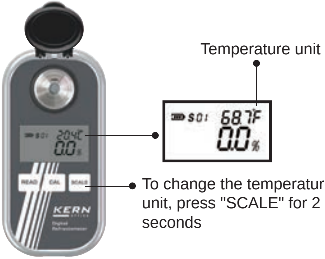
7. Changing scale & termperature unit

7.1 Changing scale



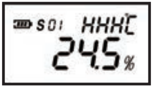
Press "SCALE" to change into another scales and show the converted value

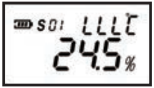
7.2 Changing termperature unit



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%

2024/09 V3.2