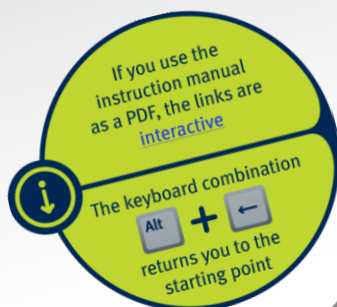


DIGITAL HANDHELD REFRACTOMETER | DR201-95

INSTRUCTION MANUAL | VERSION 3.1 | JULY 2022



Preface

- The information provided in this INSTRUCTION MANUAL is essential for the assembly and safe operation of A.KRÜSS devices.
- The information is presented in a brief, clearly arranged format. The chapters are numbered throughout.

- ① If you have the instruction manual in digital form, the [links](#) are interactive. The keyboard combination ALT and ← returns you to the starting point.
- ① The table of contents is also interactive.

- Please note that we reserve the right to make changes to design, equipment, and technology. For this reason, no claims concerning specific features of the device can be derived from the content of this instruction manual.

Representational conventions

CHARACTER	DESCRIPTION
①	Additional information, explanations, and references outside the current action step
1)	Legend reference
⇒	At the beginning and end of the sections covering action guidelines. For: REQUIREMENT, procedure, and result
1.	Indicates the sequence of action steps
↻	Background information on the relevant action step
✓	Indicates partial results or interaction results in action guidelines
▶	At the beginning of corrective measures listed in the chapter Troubleshooting

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1 Intended use

1.1 Performance description

The DR201-95 is a compact, mobile, and splash-water proof digital handheld refractometer. It is used for the measurement of the refractive index (nD) and the sugar content in % (%Brix) of liquid and viscous samples. The device determines the refractive index between nD 1.3330–1.5318 and the sugar content in the range of 0–95 %Brix. The integrated temperature sensor determines the temperature, which is displayed on the LCD. The digital refractometer offers an automatic temperature compensation for the whole Brix scale in the range of 10–40 °C. Details on samples and measurements can be found in the A.KRÜSS [Campus](#).

DEVICE TYPE	DEVICE SPECIFICATION
DR201-95	<ul style="list-style-type: none">■ Measurement range from nD 1.3330–1.5318 and 0–95 %Brix■ Integrated thermometer

1.2 Permissible usage conditions



WARNING

Danger arising from impermissible use of devices

- Only use the device in the prescribed area of application.
- Do not use the device in hazardous areas.

The device is not designed for use in potentially explosive environments or as a medical electrical device according to DIN EN 60601-1 or IEC 60601-1.

The device must not be modified in any way whatsoever.

1.3 Application areas

The DR201-95 is used in the food industry, pharmacies, and investigations offices, as well as in research and teaching.

The device is suitable for the following investigations and [areas of application](#):

- Identity tests, purity control and concentration determination of raw materials, semi-finished products, and end products
- Determination of sugar concentration
- Incoming and outgoing goods inspections
- Controlling foodstuffs and pharmaceuticals

1.4 Obligations of the operator

The operator must ensure that the devices are used exclusively as intended and that any danger whatsoever to the life, limb, or health of users or third parties are avoided. In addition, accident prevention regulations and recognised safety rules are to be observed.

The operator must ensure that all users have read and understood this instruction manual.

Non-observance of this instruction manual will void the warranty. The same applies if improper work has been carried out on the device by the customer and/or third parties without the approval of the manufacturer. Servicing work may only be carried out by expert A.KRÜSS employees.

1.5 General safety recommendations

- The device must not be opened since this could affect its functions and safety. Modifications to device components, e.g. the measurement prism, could lead to faulty measurement values.
- Only use fully functional batteries. Batteries which are exposed to mechanical stress or extreme environmental influences can impair the device function or safety.
 - ➡ Influences include heat, cold, humidity, corrosion, or vibration.
- Remove the battery when the device is not in use for an extended period of time; battery leakage can destroy the device.
- Do not drop the device as it may thus be damaged.

2 Device description

2.1 Device overview



Figure 1 – DR201-95 (Front view)

ITEM	DESIGNATION
1	Measurement prism (Flint glass SF4)
2	Measurement chamber for sample intake (fully chromed)
3	Lid
4	Display (LCD) showing the measured value or the temperature
5	Arrow pictogram showing of the selected measurement scale
6	READ button for switching on the device and starting the measurement
7	ZERO button <ul style="list-style-type: none"> ➡ Press once to calibrate ➡ Press and hold to adjust
8	SCALE button for selection of the measurement scale

2.2 Measurement scales



Figure 2 – Measurement scales

➡ The device contains two measurement scales: refractive index (**nD**) and concentration of sucrose [**%Brix**].

➡ The designation **BRIX (1)** indicate the measurement scale of the concentration of sucrose and **RI (2)** indicate the refractive index.

- By pressing the **SCALE button (3)** you can switch between both measurement scales. The **arrow** in the display indicates which measurement scale is activated.
- ① Various conversion tables are included for information, see [chapter 4.4 Tables](#).

2.3 Type plate

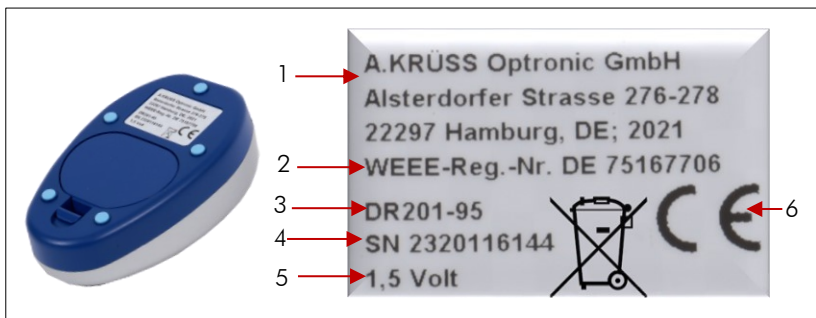


Figure 3 – Type plate

POS	Designation
1	Manufacturer's address
2	WEEE-registration number (according to directive 2012/19/EU)
3	Device type
4	Serial number
5	Electrical data
6	CE-mark

➡ The type plate is located on the bottom of the device.

2.4 Scope of delivery

DEVICE	SCOPE OF DELIVERY
DR201-95	<ul style="list-style-type: none"> Refractometer DR201-95 Battery 1.5 Volt AAA Pipette Bottle with distilled water

2.5 Technical data

2.5.1 Basic device data

DESIGNATION	KEY DATA
SCALES	<ul style="list-style-type: none"> Refractive index (nD) Concentration of sucrose [%Brix]
MEASUREMENT RANGE	<ul style="list-style-type: none"> nD 1.3330–1.5318 0–95 %Brix
MEASUREMENT ACCURACY	<ul style="list-style-type: none"> nD ± 0.0003 ± 0.2 %Brix
RESOLUTION	<ul style="list-style-type: none"> nD 0.0001 0.1 %Brix
MEASUREMENT PRISM	<ul style="list-style-type: none"> Optical glass (Flint glass SF4)
MEASUREMENT TIME	<ul style="list-style-type: none"> approx. 1 second
LIGHT SOURCE	<ul style="list-style-type: none"> LED
OPERATION	<ul style="list-style-type: none"> Buttons on membrane keypad
AMBIENT TEMPERATURE	<ul style="list-style-type: none"> 10–35 °C
AMBIENT AIR MOISTURE	<ul style="list-style-type: none"> 10–90 %, non-condensing
IP CODE	<ul style="list-style-type: none"> IP64, splash-water proof
SAMPLE CONTAINING COMPONENTS	<ul style="list-style-type: none"> Flint glass SF4, fully chromed sample intake
HOUSING	<ul style="list-style-type: none"> Synthetic material (ABS), coated
DIMENSIONS (H x W x D)	<ul style="list-style-type: none"> 130 mm x 80 mm x 40 mm
DEVICE WEIGHT	<ul style="list-style-type: none"> 180 g

2.5.2 Temperature data

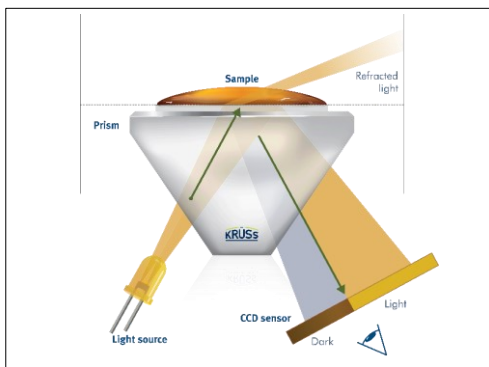
DESIGNATION	KEY DATA
TEMPERATURE MEASUREMENT	<ul style="list-style-type: none"> Integrated temperature sensor
TEMPERATURE MEASUREMENT RANGE	<ul style="list-style-type: none"> 10–40 °C
TEMPERATURE MEASUREMENT ACCURACY	<ul style="list-style-type: none"> ±0.5 °C
TEMPERATURE COMPENSATION	<ul style="list-style-type: none"> 10–40 °C
TEMPERATURE MEASUREMENT RESOLUTION	<ul style="list-style-type: none"> 0.1 °C

2.5.3 Electrical data

DESIGNATION	KEY DATA
OPERATING VOLTAGE	<ul style="list-style-type: none"> 1.5 V

2.6 Measurement principle

The refractometer measures the refractive index n_D of the sample. The refractive index changes according to the concentration or type of sample.



The sample is placed on the prism using a pipette. The beam of light of an LED shines through the prism onto the sample. Depending on the limiting angle of total reflection, which varies depending on the sample, an illuminated and an unilluminated area are created on a photodetector.

Figure 4 – Schematic depiction

The refractive index is determined from the position of these areas. In addition to the refractive index, the temperature at the prism is also determined and used for the automatic temperature compensation.

① For more information see [Campus Refraktometrie](#)

2.7 Automatic temperature compensation

The refractometer provides an automatic temperature compensation for the whole Brix scale in the temperature range of 10–40 °C. This is permanently active. The automatic temperature compensation corrects the measurement value in line with the reference temperature of 20 °C.

- ➡ This means that regardless of the temperature at which a sample is measured between 10–40 °C, the device displays the Brix value of the measured sample for 20 °C.

The following sample illustrates this:

A sucrose solution with a value of 40 %Brix at 20 °C would have a value of 39,2 %Brix at 30 °C. If the sample is measured at 30 °C, the automatic temperature compensation corrects the measured value and the refractometer displays 40 %Brix.

- ① The automatic temperature compensation is not used for the refractive index scale.

3 Unpacking and commissioning

3.1 Unpacking

NOTE

Risk of material damage during transport of the device

- Check device for transport damage after unpacking.
- Do not operate damaged devices.

- When unpacking the device, check if any transport damage has occurred. Take note of any loose parts, dents, scratches visible damage, etc.
- Before disposal, inspect the packaging material for any loose functional parts and safe if necessary.
- Return the device in the original packaging with the completed return form; see [return form](#) (A.KRÜSS website).

3.2 Commissioning

3.2.1 General requirements for operation



WARNING

Danger due to unauthorised use of the device

Improper use of device can cause serious accidents.

- Only use the device in the prescribed area of application.
- Never use the refractometer in a potentially explosive environment.

3.2.2 Positioning

Securely position the device and observe the following conditions:

- Choose a plane and non-slip surface.
- Secure the device against falling down.
- Do not place the device near table edges.

3.2.3 Inserting the battery



Figure 5 – DR201-95 insert the battery

To insert the battery

1. Open the **flap (1)** on the bottom of the device.
2. Insert the battery into the **battery housing (2)**, observing the indicated polarity, and close the cover.
3. Finally close the **flap**.

3.2.4 Switching on the device

1. Switch on the device by pressing the **READ button (3)**.
 - ✓ The **current prism temperature** is displayed.
 - 🕒 If not in use, the device switches off automatically after **3 minutes**.

3.2.5 Test measurement

- For commissioning and daily use, we recommend that an adjustment be carried out with distilled water.

4 Operation

4.1 Adjusting

- In daily use, we recommend that the device be calibrated with distilled water and adjusted if necessary.
- In an adjustment, a sample, usually a calibration standard, is measured with a known setpoint. The device is adjusted on the basis of the comparison between the measuring result of the device and the setpoint. The adjustment permanently changes the device and minimises the deviation between the measurement result and the setpoint.
- For adjustment of the refractometer a temperature compensation for distilled water is used. Therefore only distilled water is to be used.
- Before the adjustment begins, we recommend that the refractometer, the water for adjusting and the environment have the same temperature.

Adjusting

⇒ REQUIREMENT

- Switch on the device.

⇒ PROCEDURE

1. Pour about **0.4 ml** of distilled water onto the measuring prism.
 - ➞ The **prism** must be completely **covered**.
 - ➞ Ensure that there are **no bubbles** in the sample.
2. Close the **lid** of the device.
3. Wait for **5 seconds** after pouring the water onto the prism.
4. Press the **ZERO button** and keep it pressed until **"CAL"** and **"END"** are displayed in succession.
5. Carefully clean the measuring prism with a soft, dry cloth.

⇒ RESULT

The adjustment of the device with distilled water has been carried out.

- ① To check whether the adjustment has been carried out correctly, the refractometer can be calibrated with distilled water.

4.2 Calibrating

- To check whether an adjustment has been carried out correctly or to determine the deviations between measured values and expected values, the device can be calibrated.
- For calibration, a sample usually a calibration standard is measured with a known setpoint. Comparing the measurement result of the device with the setpoint will reveal deviation of the device.

Calibrating

⇒ REQUIREMENT

- Switch on the device.

⇒ PROCEDURE

1. Pour about **0.4 ml** distilled water onto the measuring prism.
 - The **prism** must be completely covered.
 - Ensure that there are no **bubbles** in the sample.
2. Close the **lid** of the device.
3. Wait for **5 seconds** after pouring the water onto the prism.
4. Briefly press the **ZERO button** once.
5. Check that the displayed reading is between **nD 1.3327 and 1.3333**.
 - The device displays the refractive index of distilled water for 20 °C.
 - Due to the tolerances of the refractometer, the range of the expected measured value is given.
6. Carefully clean the measuring prism with a soft, dry cloth.

⇒ RESULT

Calibration of the device with distilled water has been carried out.

- ① If the measured value at the measuring temperature lies beyond the tolerances, repetition of the measurement is recommended after thorough and residue-free cleaning of the prism.
- ① If the deviation remains unchanged, an adjustment should be carried out.
- ① If the refractometer is to be calibrated with (certified) calibration standards, this can be done with measurements obtained via the **READ button**.

4.3 Measuring

- In order to avoid contamination and damage of the prism as well as sample carry-over, clean the prism immediately after the measurement.
 - ➞ Make sure that the sample does not come in contact with the housing of the refractometer. Any sample material on the housing should be removed immediately.

Measuring samples

⇒ REQUIREMENT

- Switch on the device.

⇒ PROCEDURE

1. Pour about **0.4 ml** distilled water onto the measuring prism.
 - ➞ The **prism** must be completely covered.
 - ➞ The sample must not contain any **bubbles**.
2. Close the **lid** of the device.
3. Wait for 5 seconds after pouring the water onto the prism.
4. Press the **READ button** once.
 - ✓ After **1 second**, the measured value is displayed in the currently selected measurement scale.
 - ➞ To obtain the measured value of the same sample in the second measurement scale change the scale. Afterwards measure the sample once more.
5. Carefully clean the measuring prism with a soft, dry cloth.
- ① When cleaning, use a solvent suitable for the sample material for cleaning. For details see [chapter 5.3 Recommended sample-specific agents](#).

⇒ RESULT

The measurement has been carried out.

4.4 Tables

The following tables show the extent to which the refractive index of distilled water depends on the temperature, plus various conversions between the refractive index and %Brix and conventional scales and sample concentrations. All values apply at a temperature of 20 °C and a wavelength of 589 nm.

4.4.1 Table: Dependence of refractive index of distilled water vs. temperature

- The table shows the extent to which the refractive index of distilled water depends on temperature.
- Key:
 - °C = temperature
 - nD = refractive index

°C	nD
10	1.33369
11	1.33364
12	1.33358
13	1.33352
14	1.33346
15	1.33339
16	1.33331
17	1.33324
18	1.33316
19	1.33307
20	1.33299
21	1.33290
22	1.33280
23	1.33271
24	1.33261
25	1.33250
26	1.33240

°C	nD
27	1.33229
28	1.33217
29	1.33206
30	1.33194
31	1.33182
32	1.33170
33	1.33157
34	1.33144
35	1.33131
36	1.33117
37	1.33104
38	1.33090
39	1.33075
40	1.33061
41	1.33046
42	1.33031
43	1.33016

°C	nD
44	1.33001
45	1.32985
46	1.32969
47	1.32953
48	1.32937
49	1.32920
50	1.32904
51	1.32887
52	1.32870
53	1.32852
54	1.32835
55	1.32817
56	1.32799
57	1.32781
58	1.32762
59	1.32744
60	1.32725

4.4.2 Conversion table 1: %Brix and refractive index

- Conversion table 1 shows %Brix in relation to the refractive index.

Key:

- % = %Brix
- nD = refractive index

%	nD
0	1.33299
1	1.33442
2	1.33587
3	1.33732
4	1.33879
5	1.34026
6	1.34175
7	1.34325
8	1.34477
9	1.34629
10	1.34783
11	1.34937
12	1.35093
13	1.35250
14	1.35409
15	1.35568
16	1.35729
17	1.35891
18	1.36054
19	1.36219
20	1.36384

%	nD
21	1.36551
22	1.36720
23	1.36889
24	1.37060
25	1.37233
26	1.37407
27	1.37582
28	1.37758
29	1.37936
30	1.38115
31	1.38296
32	1.38478
33	1.38661
34	1.38846
35	1.39032
36	1.39220
37	1.39409
38	1.39600
39	1.39792
40	1.39986
41	1.40181

%	nD
42	1.40378
43	1.40576
44	1.40776
45	1.40978
46	1.41181
47	1.41385
48	1.41592
49	1.41799
50	1.42009
51	1.42220
52	1.42432
53	1.42647
54	1.42863
55	1.43080
56	1.43299
57	1.43520
58	1.43743
59	1.43967
60	1.44193
61	1.44420
62	1.44650

%	nD
63	1.44881
64	1.45113
65	1.45348
66	1.45584
67	1.45822
68	1.46061
69	1.46303
70	1.46546
71	1.46790
72	1.47037
73	1.47285
74	1.47535
75	1.47787
76	1.48040
77	1.48295
78	1.48552
79	1.48811
80	1.49071
81	1.49333
82	1.49597
83	1.49862

4.4.3 Conversion table 2: %Brix and urea concentration

- Conversion table 2 shows the urea concentration in relation to %Brix.

Legende: ➡ % = %Brix

➡ % vol = Volumenanteil von Harnstoff in Prozent

%	% vol		%	% vol		%	% vol		%	% vol
25.0	27.1		27.6	29.5		30.2	31.8		32.8	34.1
25.1	27.2		27.7	29.6		30.3	31.9		32.9	34.2
25.2	27.3		27.8	29.7		30.4	32.0		33.0	34.3
25.3	27.4		27.9	29.8		30.5	32.1		33.1	34.4
25.4	27.5	↓	28.0	29.9		30.6	32.2		33.2	34.4
25.5	27.6		28.1	30.0		30.7	32.3		33.3	34.5
25.6	27.7		28.2	30.1		30.8	32.4		33.4	34.6
25.7	27.8		28.3	30.1		30.9	32.5		33.5	34.7
25.8	27.9		28.4	30.2		31.0	32.5		33.6	34.8
25.9	27.9		28.5	30.3		31.1	32.6		33.7	34.9
26.0	28.0		28.6	30.4		31.2	32.7		33.8	35.0
26.1	28.1		28.7	30.5		31.3	32.8		33.9	35.0
26.2	28.2		28.8	30.6		31.4	32.9		34.0	35.1
26.3	28.3		28.9	30.7		31.5	33.0		34.1	35.2
26.4	28.4		29.0	30.8	↓	31.6	33.1		34.2	35.3
26.5	28.5		29.1	30.9		31.7	33.2		34.3	35.4
26.6	28.6		29.2	31.0		31.8	33.2		34.4	35.5
26.7	28.7		29.3	31.0		31.9	33.3		34.5	35.5
26.8	28.8		29.4	31.1		32.0	33.4		34.6	35.6
26.9	28.9		29.5	31.2		32.1	33.5	↓	34.7	35.7
27.0	29.0		29.6	31.3		32.2	33.6		34.8	35.8
27.1	29.1		29.7	31.4		32.3	33.7		34.9	35.9
27.2	29.1		29.8	31.5		32.4	33.8		35.0	36.0
27.3	29.2		29.9	31.6		32.5	33.8		-	-
27.4	29.3		30.0	31.7		32.6	33.9		-	-
27.5	29.4		30.1	31.8		32.7	34.0		-	-

4.4.4 Conversion table 3: Refractive index und ethylene glycol

- Conversion table 3 shows the freezing point of ethylene glycol in relation to the refractive index.

Key:

- **nD** = refractive index
- **°C** = freezing point

nD	°C
1.3353	-0.7
1.3392	-2.0
1.3430	-3.6
1.3468	-5.3
1.3507	-7.1
1.3545	-9.4
1.3583	-11.9

nD	°C
1.3622	-14.7
1.3660	-17.8
1.3698	-21.1
1.3737	-24.6
1.3775	-28.4
1.3813	-32.1
1.3852	-35.9

nD	°C
1.3890	-40.3
1.3929	-45.7
1.3967	-51.3
1.4005	-56.9
1.4044	-62.7
1.4050	-63.5
1.4090	-69.7

4.4.5 Conversion table 4: Refractive index and propylene glycol

- Conversion table 4 shows the freezing point of propylene glycol in relation to the refractive index.

Key:

- **nD** = refractive index
- **°C** = freezing point

nD	°C
1.3353	-0.5
1.3392	-1.4
1.3430	-2.4
1.3468	-3.7
1.3507	-5.1
1.3545	-6.6
1.3583	-8.7

nD	°C
1.3622	-11.1
1.3660	-13.4
1.3698	-16.0
1.3737	-19.0
1.3775	-22.7
1.3813	-26.5
1.3852	-31.4

nD	°C
1.3890	-38.2
1.3929	-47.3
1.3967	-57.4
1.4005	-67.3
1.4044	-77.0
—	—

5 Cleaning and maintenance

5.1 Maintenance



WARNING

- Servicing work may only be carried out by expert A.KRÜSS employees.
- Do not clean the device under flowing water or completely immerse it as damage could thus be caused.

5.2 Cleaning

Note

Improper cleaning can damage the device

- Aggressive and abrasive cleaning agents can damage the refractometer.
- Avoid strong bases and acids. They damage the plastic housing.
- Do not clean the measurement prism with mechanical means (scraper, tweezers, ...) to avoid damaging it.

Observe the following to ensure safe and reliable operation of the device:

- Correct cleaning of a refractometer is a basic requirement for precise determination of the refractive index.
- The device should be cleaned before and after each use.
- If the cleaning procedure is carried out incorrectly, a very thin layer of the previous sample may remain, which causes sample carry-over. An incorrect refractive index will subsequently be measured for the next sample.
 - ➡ Details of [cleaning procedures](#) available at the A.KRÜSS campus.

5.3 Recommended sample-specific cleaning agents

- In general, it is sufficient to clean the refractometer and measurement prism using a high quality, lint-free, antistatic cloth, and water.
 - ➞ First remove the sample with a cloth and then wipe clean with a moistened cloth.
- The best cleaning results are achieved with the following cleaning agents:

SAMPLE	CLEANING AGENT 1	CLEANUNG AGENT 2
Fruit juices	Water	Ethanol
Soft drinks	Water	Ethanol
Sugar solutions, salt solutions, honey	Water	–
AdBlue/urea	Water	–
Cleaning agents	Water	Ethanol
Ethylene glycol, propylene glycol	Water	Ethanol
Engine oil, lubricating oil	Benzine	–
Mineral oils	Isopropyl alcohol	–
Fuel, diesel, jet fuel and heating oil	Benzine, petroleum spirit	–

5.4 Exchanging the battery

- It can be assumed that a **1.5 Volt battery** will have a general service life of approx. 5000 hours.
 - ⇒ The voltage of the battery may be sufficient for normal use, but not for measurements. In this case, the device will not take a measurement or provide noticeably inaccurate readings.
 - ⇒ Wide measurement discrepancies can be caused by a used battery.
- ① In case of strong measurement deviations, the device should be calibrated with distilled water after the battery has been exchanged, [see chapter 4.1 Adjusting and calibrating.](#)
- If the error code "**LLL**" is shown on the display, the battery has to be replaced by a new one.

Exchanging the battery

⇒ REQUIREMENT

- Switch off the device.

⇒ PROCEDURE

1. To exchange the battery, open the **flap** on the bottom of the device.
2. Remove the **empty battery** and insert a replacement in correct polarity.
3. Finally, close the **flap**.

⇒ RESULT

The battery has been replaced.

- ⇒ Adjust/calibrate the device with distilled water after exchanging the battery.

6 Troubleshooting

FAULT/MESSAGE	POSSIBLE CAUSES	CORRECTIVE MEASURES
Device not working	<ul style="list-style-type: none"> Battery used up or no battery 	<ul style="list-style-type: none"> ▶ Replace or insert the battery ▶ If possible, use alkaline battery
	<ul style="list-style-type: none"> Faulty refractometer 	<ul style="list-style-type: none"> ▶ Contact Customer Service
No measurement value	<ul style="list-style-type: none"> Battery used up or no battery 	<ul style="list-style-type: none"> ▶ Replace or insert the battery ▶ If possible, use alkaline battery
	<ul style="list-style-type: none"> Bubbles in the measuring cell 	<ul style="list-style-type: none"> ▶ Reapply sample without bubbles
	<ul style="list-style-type: none"> Faulty measurement LED 	<ul style="list-style-type: none"> ▶ Contact Customer Service
Poor precision	<ul style="list-style-type: none"> Unsteady ambient conditions 	<ul style="list-style-type: none"> ▶ Create external temperatures as constant as possible
	<ul style="list-style-type: none"> Bubbles in the measuring cell 	<ul style="list-style-type: none"> ▶ Reapply sample without bubbles
	<ul style="list-style-type: none"> Contaminated prism 	<ul style="list-style-type: none"> ▶ Clean the prism
Wrong measurement values	<ul style="list-style-type: none"> Faulty adjustment 	<ul style="list-style-type: none"> ▶ Adjust
	<ul style="list-style-type: none"> Contaminated prism 	<ul style="list-style-type: none"> ▶ Clean the prism thoroughly
Wrong temperature	<ul style="list-style-type: none"> Battery used up or no battery 	<ul style="list-style-type: none"> ▶ Replace or insert the battery ▶ If possible, use alkaline battery
	<ul style="list-style-type: none"> Faulty temperature sensor 	<ul style="list-style-type: none"> ▶ Contact Customer Service
Membrane keypad not working	<ul style="list-style-type: none"> Faulty membrane pad 	<ul style="list-style-type: none"> ▶ Contact Customer Service

Continued: Troubleshooting

FAULT/MESSAGE	POSSIBLE CAUSES	CORRECTIVE MEASURES
Measurement values of reference substances outside the range of specification	<ul style="list-style-type: none"> Reference substances contaminated or too old 	<ul style="list-style-type: none"> Check substance regarding purity and age Use only pure and not out-of-date substances Use only distilled water for the measuring of water
	<ul style="list-style-type: none"> Deviation of the given data of the calibrating standards 	<ul style="list-style-type: none"> Check setpoint data
	<ul style="list-style-type: none"> Adjustment necessary 	<ul style="list-style-type: none"> Perform adjustment
Error code "HHH"	<ul style="list-style-type: none"> Measuring value above measurement range (over nD 1.5318) 	<ul style="list-style-type: none"> Sample not measurable
	<ul style="list-style-type: none"> Adjustment necessary 	<ul style="list-style-type: none"> Perform adjustment
Error code "LLL"	<ul style="list-style-type: none"> Battery used up 	<ul style="list-style-type: none"> Exchange battery If possible, use alkaline battery
	<ul style="list-style-type: none"> Measuring value under measurement range (below nD 1.3320) 	<ul style="list-style-type: none"> Sample not measurable
	<ul style="list-style-type: none"> Adjustment necessary 	<ul style="list-style-type: none"> Perform adjustment

- **Important note:** Observe the specified safety instructions; if a fault is rectified improperly, the warranty will become void.
- If the remedial actions cannot correct the fault, contact A.KRÜSS Optronic GmbH [Customer Service](#).

7 Decommissioning



WARNING

Risk of injury from materials and substances

- Before disposing of the device, clean it, decontaminate it professionally and remove all sample residues.
- The device must be disposed of by experienced persons and in compliance with applicable environmental regulations.

If the device is not being used for some time, remove the battery.

- ➡ Ensure that a third party cannot improperly start it.

When disposing of the product, observe the respective statutory regulations and information concerning the disposal of electric and electronic equipment in the European Union. Since these regulations differ from country to country, it may be necessary to contact the supplier.



Electrically operated devices are disposed of in accordance with national rules pursuant to EU-directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE). According to this directive all devices in the business-to-business sector which have been delivered after 13.08.2005, may no longer be deposited as municipal or household waste. The devices are marked with the adjacent symbol.

In Germany, this labelling has been valid since 23.03.2006. The manufacturer must offer an appropriate option for taking back all devices delivered as of 13.08.2005. For any device delivered before 13.08.2005 the last user is responsible for its proper disposal.

8 Terms of Warranty

A.KRÜSS undertakes to provide warranty for material and manufacture of the device over a period of 12 months from the date of shipment. During this warranty period, A.KRÜSS will remedy any defect covered by the warranty by repairing or replacing the device. For repair or service, the device must be sent to A.KRÜSS. In case of warranty repairs, A.KRÜSS will assume the shipment costs; otherwise the customer must bear these costs.

A.KRÜSS guarantees that the hardware designed by A.KRÜSS for this device is faultless when used in conformity with the information provided by the manufacturer. However, A.KRÜSS undertakes no warranty for the correct and uninterrupted operation of the device or for the complete accuracy of this instruction manual. We are also not liable for subsequent damage.

Warranty limitations:

The warranty described above does not cover faults errors and defects resulting from improper handling, modification, and misuse of the device, or for any operation outside the specified environment and unauthorized maintenance. Further claims will not be accepted or recognised. A.KRÜSS Optronic explicitly does not guarantee the usefulness or efficient deployment of the device in certain areas of application.

A.KRÜSS reserves the right to modify this instruction manual and the technical data of the described device at any time. A. KRÜSS devices are only fit for shipment if properly enclosed in the complete original packaging and provided with a [return form](#). If necessary, please request replacement packaging from your supplier.

Sent devices to:

A.KRÜSS Optronic GmbH, Alsterdorfer Straße 276–278, 22297 Hamburg, Germany,
Tel. +49 40 514317-0, Fax +49 40 514317-60,
E-Mail info@kruess.com, Web www.kruess.com/en

9 EC Declaration of Conformity

PRODUCT DATA

Product designation Digital handheld refractometer

Type of Modell DR201-95

Manufacturer A.KRÜSS OPTRONIC GmbH

Address Alsterdorfer Str. 276–278,
22297 Hamburg, Germany

The indicated product is in conformity with the regulations of the following EC directives:

- 2014/30/EU – EMC-Directive
- 2014/35/EU –Low Voltage Directive
- 2011/65/EU –RoHS Directive

- EN 55011 (2009) + A1 (2010)
 - Radio frequency disturbance characteristics – Limits and methods of measurement; Group 1, class A
- EN 61326 (2013)
 - EMC requirements – Part 1: General requirements; fundamental electromagnetic environment
- EN 61010-1 (2010)
 - Safety requirements for electrical laboratory equipment

Place, date:

Hamburg, 01.07.2022

Compliance Officer:



Karin Leibrock (Managing Director)

This declaration certifies compliance with the cited regulations but does not represent any guarantee of specific features. The safety instructions described in the relevant product information are to be observed.

OTHER REFRACTOMETERS FROM A.KRÜSS OPTRONIC



Abbe refractometer – AR4

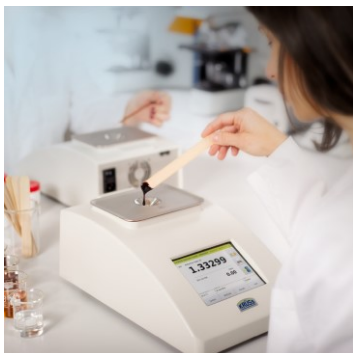
The AR4 determines the refractive index between n_D 1.3000–1.7200 and the sugar content in the range of 0–95 % Brix. The scales and measured values can be set manually by means of a drive knob and can be read via an eyepiece. A circulation thermostat can be connected for temperature control. The LCD display shows the current temperature.



Digital handheld refractometer - DR301-95

As a mobile hand-held device or digital tabletop unit, the DR301-95 can measure the refractive index or sugar content in a measuring range of n_D 1.3330-1.5318 or 0-95 %Brix. In addition, the device measures the salinity and allows for the use of two additional freely definable scales. The automatic temperature compensation for the Brix scale can be optionally connected.

The USB interface allows to connect the device to a PC. This enables to control it with the PC and to save the measured values.



Digital refractometer - DR6000 series

The digital refractometers of the DR6000 series allow semi-automatic and fully automatic operation. They are operated via capacitive 7.0 inch touch screens with a fast processing unit. Pre-defined scales: Refractive index, %Brix sucrose, %Brix invert sugar, %Brix glucose, %Brix fructose. On request, any number of additional scales can be installed. Measurement of turbid or highly viscous samples is possible. Conformity with global standards and norms. Measurements

according to reproducible procedures, in accordance with 21-CFR Part 11.



Hamburg headquarters of A.KRÜSS Optronic



We are a leading manufacturer of high-precision laboratory and analysis instruments. For more than 220 years we have been developing and manufacturing innovative product solutions for the quality control of raw materials, semi-finished and end products in Germany.



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As part of the quality assurance, we are committed to, our measurement devices provide important key figures with which product quality and product safety can be monitored and ensured.



Intertek

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For more information, just scan the QR code.

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