



# User Manual

Refractometer PCE-010 / PCE-018 / PCE-032 / PCE-4582 / PCE-5890 / PCE-Oe / PCE-SG / PCE-ALK  
/ PCE-0100



User manuals in various languages (français, italiano, español, português, nederlands, türk, polski, русский, 中文) can be found by using our product search on: [www.pce-instruments.com](http://www.pce-instruments.com)

Last change: 25 February 2022  
v1.0



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## 1 Safety notes

Please read this manual carefully and completely before you use the device for the first time. The device may only be used by qualified personnel and repaired by PCE Instruments personnel. Damage or injuries caused by non-observance of the manual are excluded from our liability and not covered by our warranty.

- The device must only be used as described in this instruction manual. If used otherwise, this can cause dangerous situations for the user and damage to the meter.
- The instrument may only be used if the environmental conditions (temperature, relative humidity, ...) are within the ranges stated in the technical specifications. Do not expose the device to extreme temperatures, direct sunlight, extreme humidity or moisture.
- Do not expose the device to shocks or strong vibrations.
- The case should only be opened by qualified PCE Instruments personnel.
- Never use the instrument when your hands are wet.
- You must not make any technical changes to the device.
- The appliance should only be cleaned with a damp cloth. Use only pH-neutral cleaner, no abrasives or solvents.
- The device must only be used with accessories from PCE Instruments or equivalent.
- Before each use, inspect the case for visible damage. If any damage is visible, do not use the device.
- Do not use the instrument in explosive atmospheres.
- The measurement range as stated in the specifications must not be exceeded under any circumstances.
- Non-observance of the safety notes can cause damage to the device and injuries to the user.

We do not assume liability for printing errors or any other mistakes in this manual.

We expressly point to our general guarantee terms which can be found in our general terms of business.

If you have any questions please contact PCE Instruments. The contact details can be found at the end of this manual.



## 2 Operation

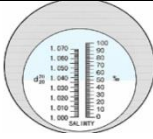
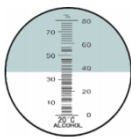
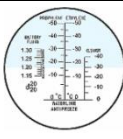
At the beginning of the measuring procedure, carefully clean the hinged lid and the prism and then dry them. Now place 1-2 drops of the sample on the prism. When closing the hinged lid, the sample is evenly distributed between the lid and the prism. To put the sample on the main prism, you can use the pipette. Make sure that no air bubbles form as this would negatively affect the measurement result. By moving the hinged lid slightly, the sample liquid can be distributed evenly. Now hold the refractometer against bright daylight. You can now see the scale through the eyepiece. The value is read between the light / dark border. By turning the eyepiece, you can focus the scale if necessary. To prevent deposits from forming on the prism and the lid, the device should be carefully cleaned and dried after each measuring process.

Refractometers work according to the principle of light refraction. With these devices, you can easily and accurately determine the concentration of e. g. starch, glues, adhesives..., the mixing ratio of liquid media and the sugar content of milk, juice, wine.... Thus, the devices can be used in many industries as a quick measuring instrument in production and laboratories. All models have automatic temperature compensation (ATC).

- Simply coat the prism with the liquid to be measured.
- Read the concentration value on the optical scale.
- Automatic temperature compensation ATC
- Robust metal housing
- Supplied with pipette, screwdriver, case

## 3 Technical data

Models	PCE-010	PCE-018	PCE-032	PCE-4582 PCE-5890	PCE-Oe
Meas. range	0 ... 10 % Brix	0 ... 18 % Brix	0 ... 32 % Brix	45 ... 82 % Brix 58 ... 90 % Brix	0 ... 140 ° Oechsle
Accuracy	0.1 %	0.1 %	0.2 %	0.5 %	2 ° Oe
Resolution	0.1 %	0.1 %	0.2 %	0.5 %	2 ° Oe
Applications	Fruit, juices, oils, cutting compounds, lubricants	Fruit juices, soft drinks, beer, mixed drinks	Emulsions, starches, glues, mulled wines	Viscous juices, condensed milk, jams	Wines
Temperature comp..	10 ... 30 °C	10 ... 30 °C	10 ... 30 °C	10 ... 30 °C	10 ... 30 °C
Display					
Dimensions	200 x Ø29mm	200 x Ø29mm	172 x Ø29mm	147 x Ø29mm	172 x Ø29mm
Weight	280g	280g	260g	240g	260g

Models	PCE-0100	PCE-ALK	PCE-SG
Meas. range	0 ... 100 % salt content	0 ... 80 % vol.	0 °C ... 50 °C coolant / antifreeze 0 °C ... -40 °C cleaning agent 1.15 - 1.30 SG battery acid content
Accuracy	0.001	1 %	± 5 °C antifreeze ± 5 °C detergent ± 0.01 SG battery acid content
Resolution	0.001 %	1 % ( 0 ... 60 % vol.) 2% ( 60 ... 80 vol.)	5 °C antifreeze 5 °C detergent 0.01 SG battery acid content
Applications	Salinity	Alcoholic beverages	Lubricants, coolants, antifreeze, cleaning agents, battery acid content
Temperature comp..	10 ... 30 °C	10 ... 30 °C	10 ... 30 °C
Display			
Dimensions	200 x Ø29mm	203 x Ø29mm	157 x Ø29mm
Weight	300g	280g	230g

## 4 Scope of delivery

Refractometer, pipette, adjusting screwdriver, care cloth, instructions, case

## 5 Evaluation

### Evaluation of the alcohol content in must by refractometry

With the refractometer, you can indirectly determine the potential alcohol content by determining the sugar content of the must.

The higher the sugar content of a must, the higher its density. This means that the light beam has a slower velocity and endures a deviation. This deviation depends on the sugar concentration and other soluble substances, so that the higher the concentration, the greater the deviation of the incident light beam and vice versa. The refractometer allows to check the relationship between the refractive index and the sugar concentration in different units of measure by the correct use of graduated scales. The main unit of measurement displayed on the refractometer is Brix (° Brix) or per cent in sucrose. You have to take into account that the temperature has an influence on the sample. Therefore, you have to use a temperature correction to be able to measure under regular temperature, the European standard is 20 °C. Our refractometers do not need a temperature correction because they include an automatic temperature compensation and all values are measured below 20 °C.

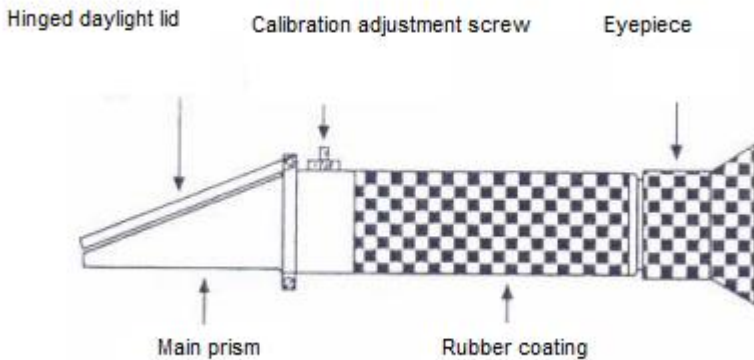


Before you use the device, it must be calibrated. The sample must be prepared by filtering the must. The first drops are discarded (to use our refractometers, the temperature of the sample must be within a range of 20 ... 30 °C and must never exceed 30 °C). Now place 1 - 2 drops of the sample on the prism. By moving the hinged lid slightly, the sample liquid can be distributed evenly. Two measurements should be made.

After having the result in Brix (per cent in sucrose), you can calculate the alcohol content with the help of a formula (valid for the range 15 ... 25 Brix):

$$\% \text{ vol} = (0.6757 \times \text{°Brix}) - 2.0839$$

or you can use the chart below, especially when the range is exceeded.



**EXAMPLE:**

With our refractometer, we measured a sample with a sugar concentration of 24.2° Brix. If we do not have any charts and want to determine the alcohol content, we have to apply the formula:

$$\% \text{ vol} = (0.6757 \times 24.2^\circ) - 2.0839 = 16.35 - 2.0839 = 14.31 \% \text{ vol}$$

If we have charts, we can look for the reading **24.2°** in the first column and get the corresponding value of alcohol content in the last column. In our example for **24.2° Brix**, the alcohol content is **14.28 % vol**.

## 6 Calibration

Before calibration, carefully clean and dry the instrument. Now add 1-2 drops of distilled water to the prism. If the light / dark limit is not at 0 % (water line), this must be adjusted via the calibration screw under the rubber cover, using the screwdriver supplied. The PCE-4582 and PCE 5890 cannot be calibrated with distilled water, a sample solution with a known sugar content (e. g. 70 % sugar solution) should be used.

### Note:

Instruments are already calibrated at the factory.

Important notes:

- The hinged lid and the prism should be kept clean at all costs; dirt will impair the measuring accuracy.
- Avoid scratches on the prism and the hinged lid, this also has a negative influence on the measurement.
- Do not use any sharp, aggressive cleaning agents for cleaning but only a damp cloth. Dry the meter well afterwards.
- Clean the instrument only with a damp cloth, never under water, as this could penetrate the instrument.
- Prevent shocks and impacts as this can destroy the optics
- Store the instrument in a dry place.

## 7 Contact

If you have any questions, suggestions or technical problems, please do not hesitate to contact us. You will find the relevant contact information at the end of this user manual.

## 8 Disposal

For the disposal of batteries in the EU, the 2006/66/EC directive of the European Parliament applies. Due to the contained pollutants, batteries must not be disposed of as household waste. They must be given to collection points designed for that purpose.

In order to comply with the EU directive 2012/19/EU we take our devices back. We either re-use them or give them to a recycling company which disposes of the devices in line with law.

For countries outside the EU, batteries and devices should be disposed of in accordance with your local waste regulations.

If you have any questions, please contact PCE Instruments.





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