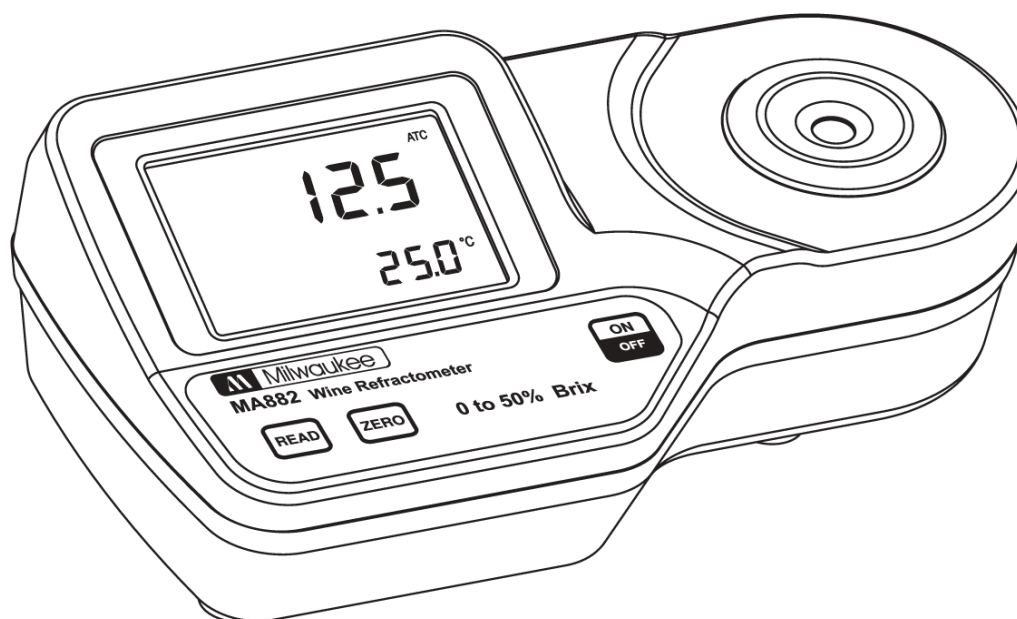




Digital refractometer 0-230°Oe + 0-50%Brix



Remove the instrument from the packaging and check for damage caused during transit. Please contact your distributor or Brouwland immediately if it appears to be damaged. Every instrument is supplied with the following:

- 9 V battery
- User guide

N.B.: Do not dispose of the packaging until you are sure that the instrument is functioning correctly. Defective instruments should be returned in the original packaging.

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GENERAL DESCRIPTION

Thank you for purchasing this instrument. This user guide provides you with all the information required to use the equipment correctly. The refractometer is an optical instrument used to determine the refractive index of the sugar content (saccharometry) of watery solutions. It is quick and easy to use and gives the winemaker an accurate method for analysing the sugar content. The samples are measured after a quick calibration using distilled or demineralised water. The refractive index is measured after a few seconds. This digital refractometer rules out any unreliable results and is easily carried for taking measurements outdoors.

The instrument uses internationally accepted standard references for unit conversion and temperature compensation.

The refractor measures the following:

- %Brix
- °Oeschle (°Oe)
- °KMW (°Babo)

The temperature (°C or °F) is shown on the primary display simultaneously with the measurements and together with icons for the battery voltage and other useful information.

Important features:

- LCD screen with twin levels.
- Automatic temperature compensation (ATC)
- Simple programming and memory
- Battery voltage detection
- Auto switch-off after 3 minutes pause
- Single point calibration for distilled or demineralised water
- Fast and precise results displayed after ± 1.5 seconds
- Requires only small samples, 2 drops are sufficient.

SPECIFICATIONS

Range:	0 to 50%Brix	0-230°Oe	0-42°KMW	0-80°C (32-176°F)
Resolution:	0.1%Brix	1°Oe	0.1°KMW	0.1°C (0.1°F)
Accuracy:	$\pm 0.2\%$ Brix	$\pm 1^\circ$ Oe	$\pm 0.2^\circ$ KMW	$\pm 0.3^\circ$ C ($\pm 0.5^\circ$ F)

Light source: Yellow

LED measuring period: Approximately 1.5 sec

Minimum sample quantity: 100 μ L (covering entire prism)

Sample cell: Stainless steel ring and flint glass prism

Temperature compensation: Automatic between 10 and 40°C (50 to 104°F)

Housing: ABS plastic

Battery type/life-span: 1 x 9 V AA battery / 5000 readings

Auto switch-off: After 3 minutes of not being used

Dimensions: 19.2 x 10.2 x 6.7 cm

Weight: 420 grams

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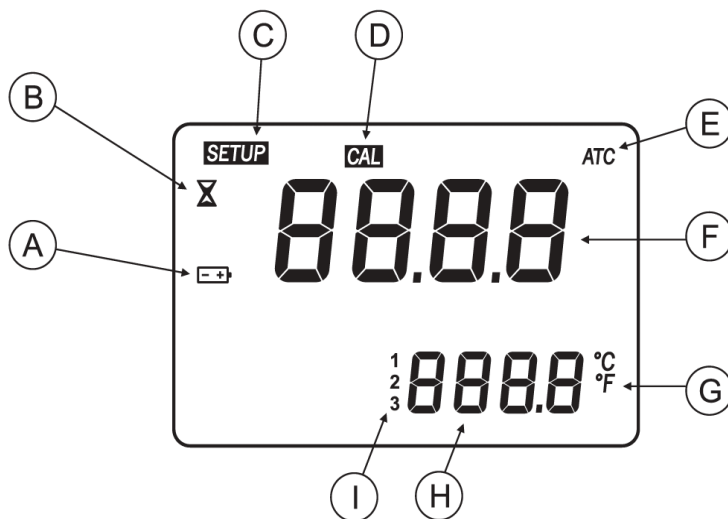
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DESCRIPTION OF FUNCTIONS



Display

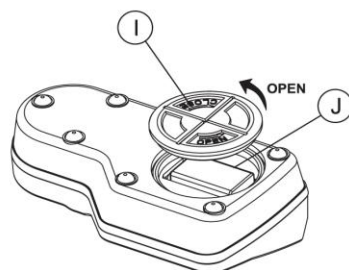
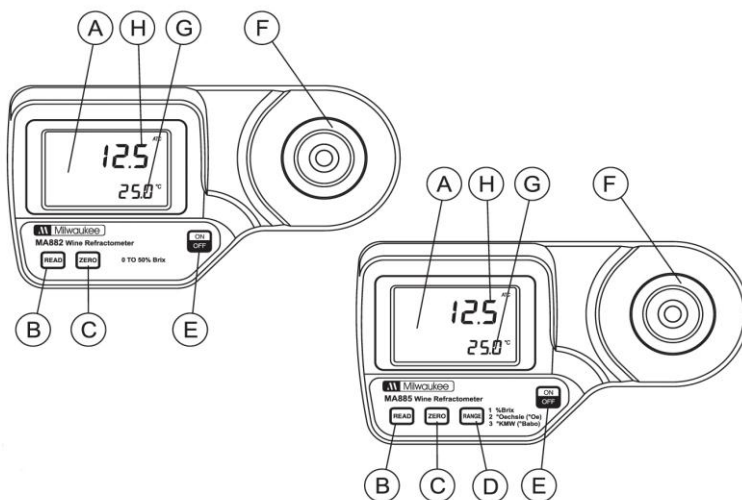
- A. Battery status: Lights up when the battery voltage is low
- B. Operation of the measuring function
- C. Set-up: Factory settings
- D. CAL: Calibrating
- E. Automatic temperature compensation (ATC): Lights up when the temperature exceeds 10-40°C
- F. Primary display: Displays measurement results and error messages
- G. Temperature unit
- H. Secondary display: Shows temperature results (lights up when the temperature is exceeded: 0-80°C)
- I. Range indicator: Range

Front panel

- A. Liquid Crystal Display (LCD display)
- B. Read key (measurement)
- C. Zero key (calibration)
- D. Range key
- E. On/Off
- F. Stainless steel sample cell and prism
- G. Secondary display
- H. Primary display underside

Underside

- I. Battery cover
- J. Battery compartment



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USAGE

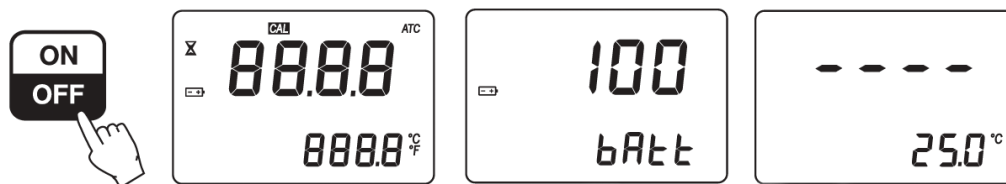
Measuring instructions

- Handle the refractometer with care. Do not drop.
- Do not hold the instrument under water.
- Do not spray water over the instrument except over the sample cell with the prism.
- The refractometer is designed for measuring grape juice/wine solutions. Do not use (organic) solvents or extremely hot or cold solutions that could damage the prism.
- Hard particles in the solution can scratch the prism. Between every two measurements wipe away the sample with a soft cloth and then thoroughly clean using demineralised or distilled water.
- Keep the sample shaded when working in direct sunlight.

Calibration procedure

Calibration must be done daily, including before the measurements are taken, when the battery was replaced, between two long series of measurements, or when there are changes in the environment after the final measurement has been taken.

1. Press ON/OFF then release. Two test screens will then appear: All the LCD segments followed by the remaining battery life-span percentage. The instrument is ready to take measurements whenever "----" appears on the screen.



2. Fill the sample cell with distilled or demineralised water using the plastic pipette. Ensure that the sample cell is completely covered.

N.B.: If the external light is strong, the sample should be kept shaded by putting a hand over it during calibration.

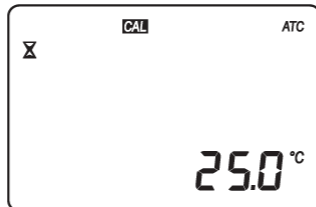


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3. Press the ZERO key. The instrument is calibrated if no error message appears.

N.B.: The indicator remains at 0.0 for as long as no measurement is made, or the equipment is switched on.



4. Carefully wipe away the distilled water using a soft cloth. Avoid scratching the prism. Thoroughly dry off the surface of the prism. The refractometer is now ready for use.



Measuring procedure

Check that the instrument has been calibrated.

1. Ensure that the sample cell and prism are completely dry.



2. Drop the solution to be measured onto the prism surface using the pipette. Completely fill the sample cell. N.B.: If the temperature of the solution differs greatly from the temperature of the meter, wait for approximately one minute in order to obtain a more even balance in temperature.

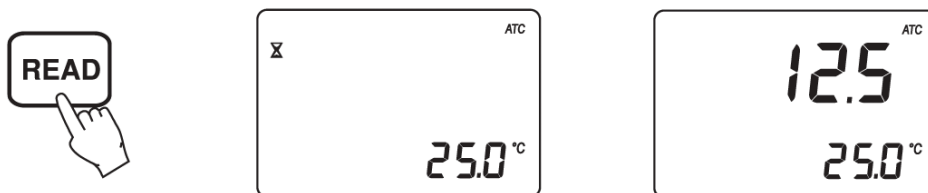


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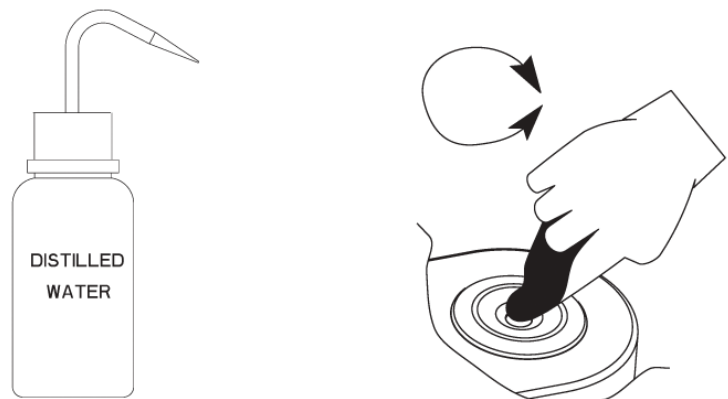
3. Press the READ key. The result appears on the display in the type of unit you have selected. N.B.: The last measurement remains on display until a new measurement is made, or until the instrument is switched off.

N.B.: The ATC icon lights up when the temperature falls outside the 10 to 40°C range.



4. Remove the solution by carefully wiping it away with a soft cloth.

5. A plastic pipette should be used when cleaning the sample cell and prism with distilled or demineralised water. Dry it off with a soft cloth. The instrument is now ready for taking the next measurement.



Changing the unit of measurement

Press the RANGE key in order to select the %Brix, °Oeschle or °KMW (°Babo) units of measurement. The unit switches between each of the 3 scales every time you press the key: "bri" for %Brix, "OE" for °Oeschle or "bAbo" for °KMW. The instrument is ready to use as soon as "----" appears. The number on the display indicates the unit of measurement selected: "1" stands for %Brix, "2" for °Oe and "3" for °KMW as indicated on the equipment.



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Switching temperature units

Do the following to switch between the °C and °F temperature measurements:

1. Press the ON/OFF key and hold it in for roughly 8 seconds. In the primary display the instrument then shows all the segments, followed by the model numbers, and the secondary display shows the production version. Keep the ON/OFF key depressed.



2. With the ON/OFF key still depressed, now press the ZERO key. The unit of measurement for the temperature now changes from °C to °F or vice versa.



Making a standard %Brix solution

- Place a beaker on the calibrated scales.
- Zero the scales.
- To make a x %Brix, weigh x gram Ultrapure Sucrose (CAS #: 57-50-1) in a beaker.
- Add distilled or demineralised water until the total weight of the solution is 100 grams.
- N.B.: Solutions above 60%Brix must be thoroughly mixed or shaken and heated in a warm bath. Remove the solution from the warm bath once the sucrose is dissolved. The total amount can be poured in smaller quantities, although this can affect the accuracy of the measurements.

For example 25%Brix:

%Brix	g sucrose	g water	gr total
25	25.000	75.000	100.00

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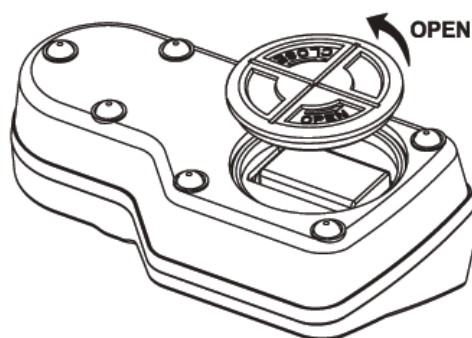


ERROR MESSAGES		
ERROR CODE		DESCRIPTION
Err		General error message. Replace battery. If this does not help, please contact your distributor or the technical service department at Brouwland.
LO		The sample solution is lower than the 0%Brix standard that was used at calibration.
HI		The sample solution is higher than the maximum measuring range of the instrument.
LO + CAL		Cal lights up after LO: Wrong solution used for calibrating at zero. Use distilled or demineralised water and then press the ZERO key.
HI + CAL		Cal lights up after HI: Wrong solution used for calibrating at zero. Use distilled or demineralised water and then press the ZERO key.
t LO + CAL		Cal lights up as well as t LO: ATC not possible because the temperature is lower than the 10°C limit during calibration.
t HI + CAL		Cal lights up as well as t HI: ATC not possible because the temperature was higher than the limit of 40°C during calibration.
Air		Insufficient solution on the prism. Add more solution.
ELt		Too much external light: Cover the prism using your hand.
nLt		The LED light source is not available: Contact your distributor or the technical service department at Brouwland.
Battery icon lights up.		Only 5% of the battery voltage remaining. Replace battery.
Temperature reading lights up.		Temperature out of range (0 to 80°C)
ATC lights up		Outside ATC range (10 to 40°C)
SETUP lights up		Factory settings are lost. Contact your distributor or the technical service department at Brouwland.

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**REPLACE BATTERY**

- Switch off the instrument by pressing the ON/OFF key.
- Turn the instrument upside down and remove the battery cover by rotating it anti-clockwise.



- Remove the battery.
- Place the new 9 V battery in the compartment. Check the polarity (+ and -)
- Close the compartment by rotating the cover clockwise. For reasons of personal safety, do not place the instrument in a dangerous environment. To avoid damage or fire, do not carry out measurements in microwave ovens.

GUARANTEE

This instrument carries a 2-year guarantee against material and production defects. If the replacement of components or repairs is required during the guarantee period, and when the damage is not the result of poor maintenance or misuse, please send the instrument to your distributor, or the technical service department at Brouwland, who will carry out repairs free of charge. Accidental damage, misuse, inexpert or poor maintenance is not covered by the guarantee. The supplier retains the right to bring about improvements to the design, construction and appearance without giving prior notice.

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