

Thank you for purchasing this OPTi® Multiple Scale Digital Handheld Refractometer. In order to ensure that this product provides many years of service, please follow the guidance in this document.

In order to register your instrument with the manufacturer and print a warranty certificate, please visit:

www.bellinghamandstanley.com

User Guide Code: 38-420*01C

Instrument overview



Safety precautions

WARNINGS

Always check the relevant Material Safety Data Sheet for a sample before applying it to the refractometer. Wear appropriate protective equipment (PPE) when applying samples that may be harmful to the skin or eyes. Avoid unnecessary contamination of the refractometer by confining samples to the prism dish.

CAUTION

This refractometer is a precision optical instrument and should be handled with care. Do not drop or subject the instrument to sharp knocks. The instrument housing and display panel areas are constructed from plastic materials that may suffer damage if contacted with aggressive solvents. For example, avoid contact with solvents such as acetone and certain aromatics.

Maintain your refractometer in a clean condition and avoid use and storage of the instrument outside the specified temperature range. Avoid dusty and high humidity environments and prolonged exposure to direct sunlight. Use the case provided to protect the instrument. Deterioration/loss of the display may be indicative of low battery power or low ambient temperature. Do not persist in using the instrument with low battery power. Check/replace the batteries as necessary. Do not use rechargeable batteries in this product.

INTENDED USE

This product is for general laboratory, manufacturing and research use only and is not intended for any animal or human therapeutic or diagnostic use.

Installing the batteries and switching ON & OFF

Installing batteries

Remove the battery compartment cover by turning the two retaining screws in an anti-clockwise direction. Before inserting the batteries check that the compartment is clean and dry, and that the cover seal is in good order. Insert the batteries, ensuring that the battery polarity is correct. Replace the cover by turning the two retaining screws in a clockwise direction whist the cover is in position.

It is recommended that alkaline batteries are used to reduce the frequency of battery changes. It is also recommended that the batteries should be removed during

Unpacking the instrument

Check that all parts listed below are present and that no transit damage has occurred.

Contents list

- 1

OPTi Digital Handheld Refractometer
- 2

AAA alkaline battery (LR03)
- 1

User guide

Setting up your OPTi

Your OPTi has been delivered with “Brix” in scale position A (580 1). For many applications this is enough to start working straight out of the box.

When first switching on, the instrument will briefly display the scale loaded to each channel. As there is only one scale active, the initial display will be:

OPTi	>>	580 1
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To overwrite and/or load other scales in A, B and C, the instrument’s special features menu must be accessed. Once loaded, the scale list on start-up will expand to show the active scales:

OPTi	>>	580 1	>>	56.34	>>	5.22
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Please note that some distributors may pre-configure your OPTi so that the scales you require are

Special features menu

Accessing the special features menu

To access the special features menu:

1.

Switch on the OPTi
2.

Press and hold READ until -0FF- is displayed
3.

Whilst -0FF- is still displayed, quickly release READ and press and release ZERO

Navigate through the menu and configure the instrument using the ZERO and READ keys.

- ZERO = Step through the menu
- READ = Enter a function
- ZERO = Step though the function options (if applicable)
- READ = Set the option and exit the feature

Display	Feature	Access	Actions
- 80.1 -	AG Test Mode	Open	Press READ to switch on AG Test Mode The instrument will enter the AG Test Mode Switch the instrument OFF to exit the AG Test Mode
- 58. -	Scale A	Open or PIN	Press ZERO to step through the list and find a scale Press READ to set and return to the menu
- 56. -	Scale B		
- 54. -	Scale C		
- 5.5 -	Temperature display	Open or PIN	Press ZERO to step through °F or °C Press READ to set and return to the menu
- 0.0 -	Delay before Read/Zero	Open or PIN	Press ZERO to step through 0 to 60 in 5-second intervals Press READ to set and return to the menu
- P in -	Set /Remove PIN protection	Open or PIN	To set your PIN: 1. Press ZERO to increment the flashing digit 2. Press READ to select the number and move to the next digit 3. Repeat to confirm 4. If correct then -set- is displayed 5. The instrument will leave the menu To remove PIN protection: 1. Enter the previously set PIN (see steps 1 and 2 above) 2. If the entered PIN is correct PASS is displayed and the PIN is removed 3. The instrument will return to the menu
- 0.0 -	Version	Open	View software version and serial number
- End -	Save/Exit	Open	Save settings and leave the menu

Certificate of verification

This instrument has been calibrated and checked for precision at 20°C.

Analytical Grade Water¹ and AG Calibration Fluids² were employed to check the accuracy of the instrument for the primary scales. All other scales are assumed as correct as their results are calculated empirically from these values.

Sample Type	Certified Value (Brix/RI)	Acceptance Limits
Analytical Grade Water	0.00 / 1.33299	±0.2 Brix / ±0.0003 RI
AG30 Fluid	30.00 / 1.38115	
AG50 Fluid	50.00 / 1.42009	

All materials used to verify the performance of this OPTi refractometer were callibrated by Bellingham & Stanley Ltd., UKAS accredited calibration laboratory no. 0834, accredited to ISO/IEC 17025:2017.

1.

Refractive index values for Water are obtained from "Revised Formulation for the Refractive Index of Water and Steam as a Function of Wavelength, Temperature and Density", adopted by the International Association for the Properties of Water and Steam (IAPWS) and available as part of NIST Standard Reference Database 10. Refractive indices calculated from the formulation are absolute refractive indices; conversion to refractive index against air requires division by the respective absolute refractive index of air (NIST Engineering Metrology Toolbox).
2.

AG calibration fluids are prepared by mixing water with a soluble chemical of higher refractive index. The Brix value of the fluid is determined using a high accuracy digital refractometer at 20.0°C, which has been calibrated with a NIST traceable sucrose calibration standard of Brix value equal to the target value for the AG fluid according to a Laboratory Procedure QL-103. The AG fluid composition is finely adjusted to give a measured value to within ± 0.01 Brix (± 0.00002 RI) at 20.0°C.

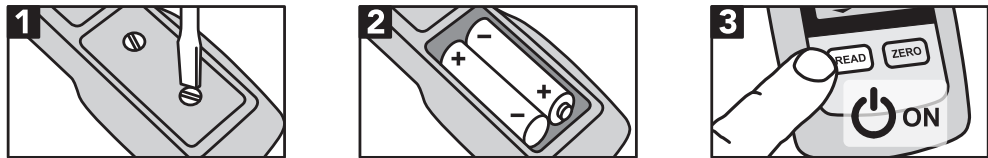
Scale list

Index	Application	Scale	Units	Range
01	Primary	°Brix (ATC)		0-95
02	Primary	°Brix (no TC)		0-95
03	Primary	Refractive Index (ATC)		1.33-1.53
04	Primary	Refractive Index (no TC)		1.33-1.53
05	Automotive	AdBlue®/DEF (NOx reduction)	% Weight / Weight	0-40
06	Automotive	Ethylene Glycol	°C Freezing Point	0 to -50
07	Automotive	Ethylene Glycol	°F Freezing Point	30 to -40
08	Automotive	Propylene Glycol	°C Freezing Point	0 to -50
09	Automotive	Propylene Glycol	°F Freezing Point	30 to -40
10	Food & Beverage	°Butyro		0-100
11	Food & Beverage	Fructose	% Weight / Weight	0-85
12	Food & Beverage	Glucose	% Weight / Weight	0-85
13	Food & Beverage	42 HFCS (High Fructose Corn Syrup)	% Weight / Weight	0-95
14	Food & Beverage	55 HFCS (High Fructose Corn Syrup)	% Weight / Weight	0-95
15	Food & Beverage	90 HFCS (High Fructose Corn Syrup)	% Weight / Weight	0-95
16	Food & Beverage	Invert Sugar	% Weight / Weight	0-85
17	Food & Beverage	Maltose	% Weight / Weight	0-60
18	Food & Beverage	Salinity (NaCl)	% Weight / Weight	0-28
19	Food & Beverage	Total Solids of Waste Milk	%	5-15
20	Food & Beverage	Water in Honey	% Weight / Weight	10-30
21	Industrial	Arbitrary		0-95
22	Industrial	Calcium Chloride	% Weight / Weight	0-40
23	Industrial	Ethanol	% Volume / Volume	0-20
24	Industrial	Ethylene Glycol	% Volume / Volume	0-60
25	Industrial	Ethylene Glycol	% Weight / Weight	0-60
26	Industrial	FSII DiEGME (ASTM D 5006)	% Volume / Volume	0.0-0.25
27	Industrial	Hydrogen Peroxide	% Weight / Weight	0-50
28	Industrial	Methanol	% Weight / Weight	0-40
29	Industrial	Propylene Glycol	% Volume / Volume	0-60
30	Industrial	Sodium Sulphate	% Weight / Weight	0-22
31	Industrial	Starch	%	0-30
32	Industrial	Sulphuric Acid (Battery Acid)	Specific Gravity (d20/20)	1.000-1.501
33	Industrial	Urea (CRC data)	% Weight / Weight	0-40
34	Life Science	Colostr al Quality		Poor / PASS
35	Life Science	Seawater (Practical Salt Units)	Part Per Thousand	0-180
36	Life Science	Seawater (Practical Salt Units)	Specific Gravity (d20/20)	1.000-1.090
37	Life Science	Serum Protein	g/100ml	0-30
38	Life Science	Urine (SG) Human³	Specific Gravity (d20/20)	1.000-1.050
39	Life Science	Urine (SG) Large Mammal	Specific Gravity (d20/20)	1.000-1.050
40	Life Science	Urine (SG) Small Mammal	Specific Gravity (d20/20)	1.000-1.050
41	Wine & Beer	°Baumé		0-50
42	Wine & Beer	°Zeiss (ABV)	% Volume / Volume	10-135
43	Wine & Beer	Alcohol Probable (AP)		0-22
44	Wine & Beer	KMW (Babo)		0-25
45	Wine & Beer	Oechsle (German)		30-130
46	Wine & Beer	Oechsle (Swiss)		0-130
47	Wine & Beer	°Plato		0-30
48	Wine & Beer	Mass Sugar (°Brix) (ATC)	% Weight / Weight	0-95
49	Wine & Beer	Mass Sugar (°Brix) (no TC)	% Weight / Weight	0-95
50	Wine & Beer	Wort (Sucrose Equivalent)	Specific Gravity (d20/20)	1.000-1.120

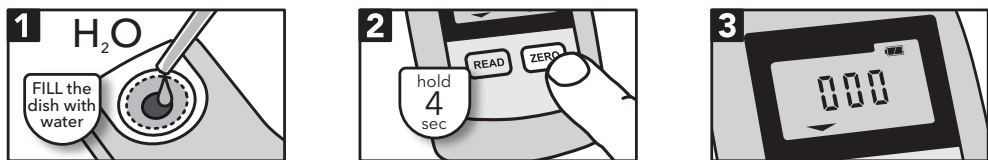
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Quick Start Guide

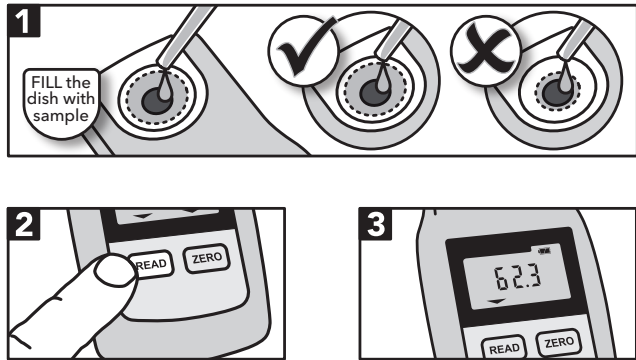
Installing batteries



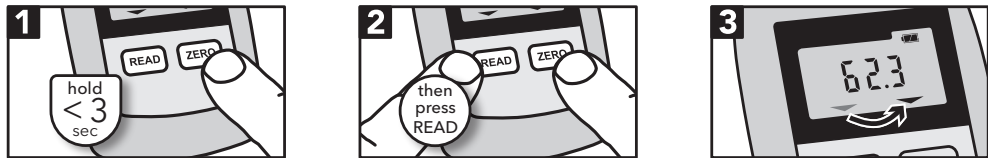
Zero calibration



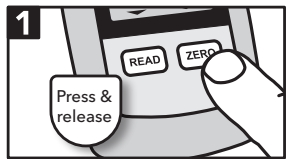
Taking a reading



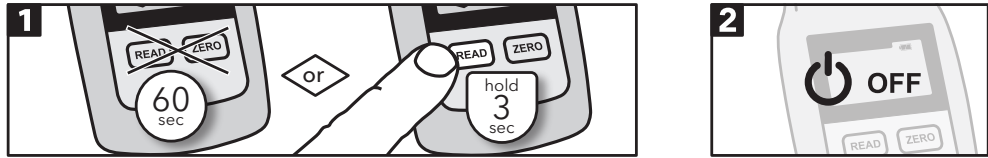
Changing measurement scale



Displaying the measurement temperature



Turning off



Manufacturer's details

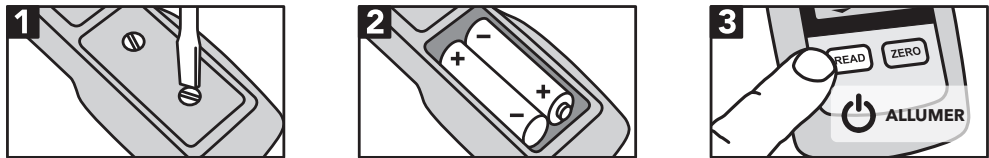
Bellingham + Stanley, a Xylem brand
Xylem Analytics Germany GmbH,
Am Achalaich 11, 82362 Weilheim, Germany
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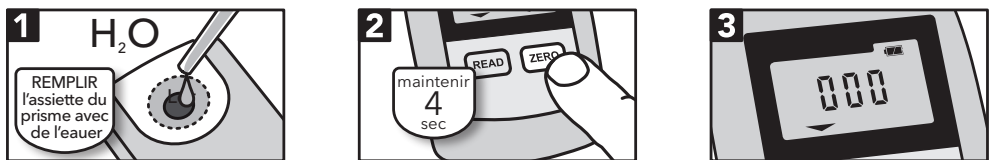
Made in China

Guide de Démarrage Rapide

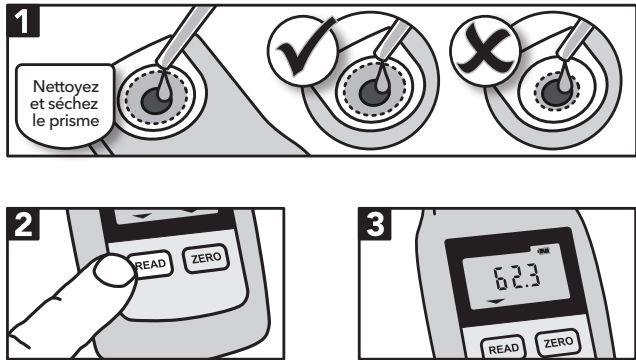
Installation des piles



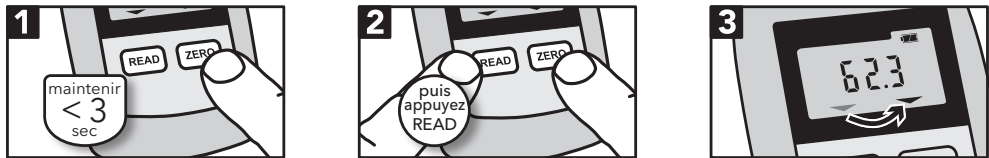
Calibrage zéro



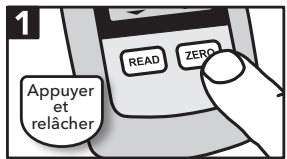
Procéder à la lecture



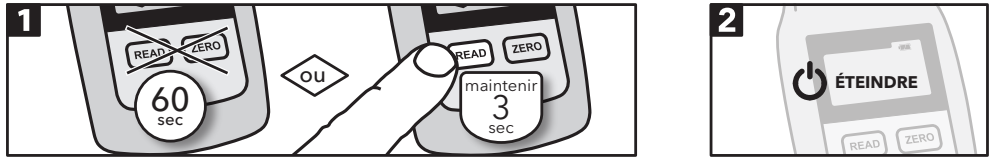
Changer l'échelle de mesure



Affichage de la température de mesure



Eteindre



Coordonnées du fabricant

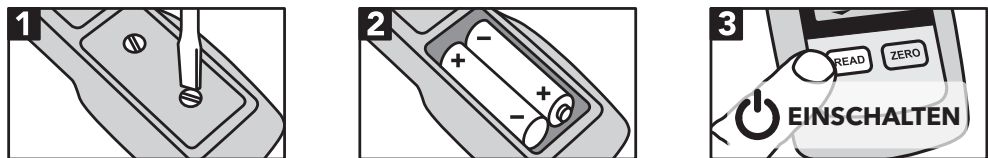
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Am Achalaich 11, 82362 Weilheim, Allemagne
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Fabriqué en Chine



Schnellstartanleitung

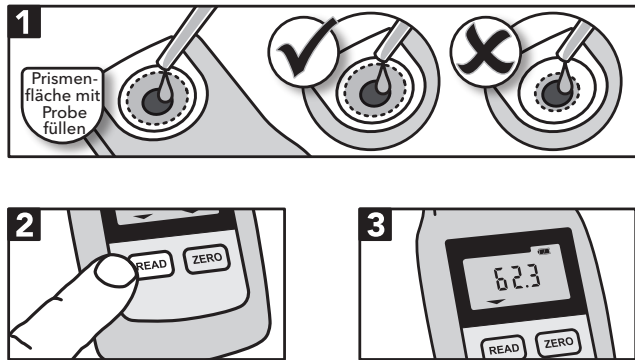
Batterien einsetzen



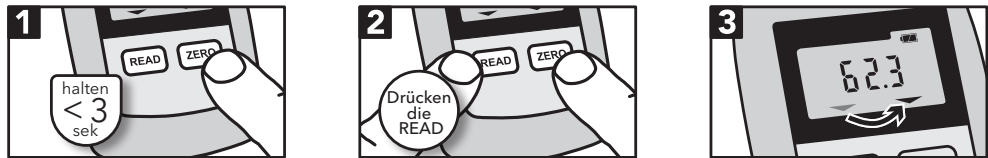
Nullstellung kalibrieren



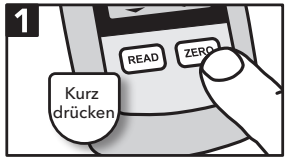
Meßwert ablesen



Meßwertskala ändern



Anzeigen der Temperatur



Gerät ausschalten



Herstellerangaben

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