

Specification

Model	Code	Scale	Range	Resolution	Accuracy	Zero sample
DR103	44-901	°Brix (% $\frac{w}{w}$ sucrose)	0 - 35	0.1	± 0.2	'0'
		RI	1.3330 - 1.3900	0.0001	± 0.0003	
DR103L	44-903	°Brix (% $\frac{w}{w}$ sucrose)	0 - 45	0.1	± 0.2	'0'
		RI	1.3330 - 1.4098	0.0001	± 0.0003	
DR112	44-904	°Brix (% $\frac{w}{w}$ sucrose)	28 - 65	0.1	± 0.2	'30'
		RI	1.3800 - 1.4535	0.0001	± 0.0003	
DR122	44-905	°Brix (% $\frac{w}{w}$ sucrose)	60 - 92	0.1	± 0.2	'60'
		RI	1.4400 - 1.5230	0.0001	± 0.0003	
DR401	44-906	Mass SW % (Brix)	0 - 35	0.1	± 0.2	'0'
		AP	0 - 22	0.1	± 0.2	
		Oe (D)	0 - 150	1	± 1	
		Babo (KMW)	0 - 25	0.1	± 0.2	
DR402	44-907	Mass SW % (Brix)	0 - 35	0.1	± 0.2	'0'
		AP	0 - 22	0.1	± 0.2	
		Oe (Ch)	0 - 150	1	± 1	
		Baumé	0 - 18	0.1	± 0.2	

All models

Temperature Compensation	Automatic Compensation (ATC) to 20°C for sucrose solutions
ATC source data	10-40°C ICUMSA data; 5-10°C B+S data
Temperature resolution	0.1°C or 1°F
Dimensions	185 x 59 x 45 mm
Weight	175g
Power supply	9V battery type MNI604, 6LR61 or PP3
Battery life	2000 readings minimum
Automatic switch off	After 90 seconds of inactivity

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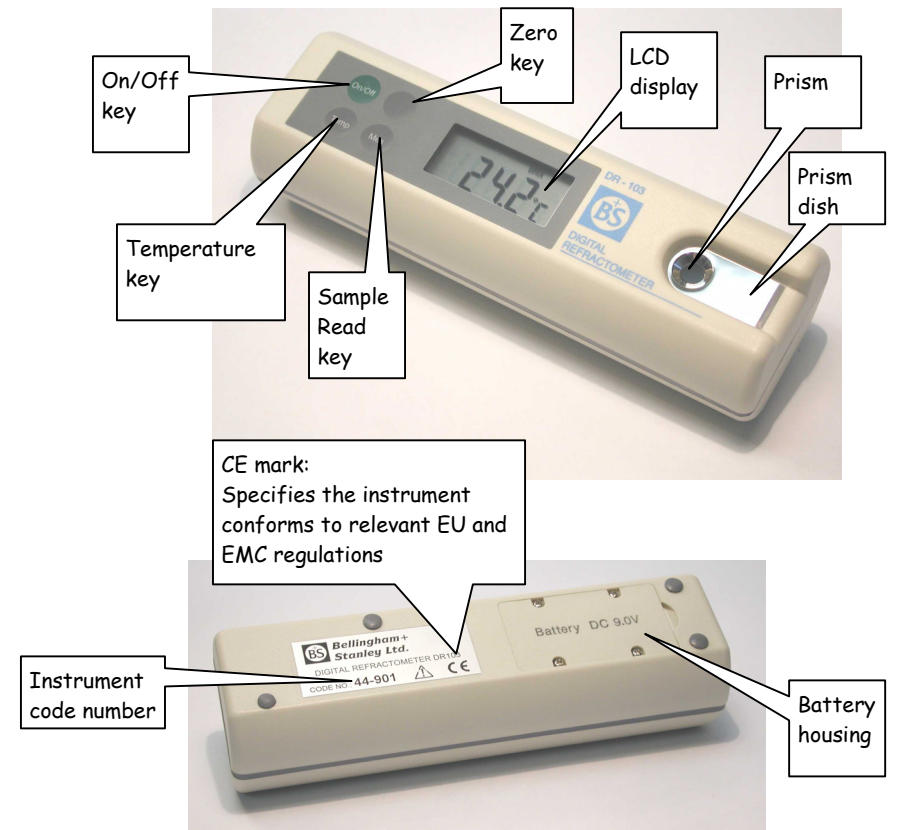
Eclipse Digital Refractometer Model DR

OPERATION MANUAL

Introduction

Thank you for purchasing the Bellingham+Stanley Digital Refractometer, Model DR. Please read these instructions carefully before using the instrument to ensure correct use and to maintain your instrument in good condition. If you have any questions about the instrument or refractometry in general, please do not hesitate to contact Bellingham+Stanley. Also, you may wish to check the company's website where you will find information about our products and applications: www.bellinghamandstanley.com

Instrument Overview



Basic Operation

- Inserting the battery** Remove the four fixing screws from the cover plate on the underside of the instrument. Fit the 9V battery type supplied. Do not allow moisture to enter the battery compartment. Re-fit the cover plate before using the instrument.
- Power On/Off** Press the *On/Off* key to switch the instrument on. The temperature will then be displayed in °C
To switch off the instrument, press the *On/Off* key. The instrument will automatically switch off after a period of 90 seconds inactivity.
- Cleaning the prism** It is important that the prism is completely clean before a test sample is applied. Residues from sample remaining on the prism can dissolve in the applied sample and affect the reading. Use a clean tissue and clean water (distilled or de-ionised) to clean the prism and the prism dish. If oil samples are being measured, then use ethyl alcohol additionally for cleaning. Do not use aggressive solvents such as acetone.
- Taking readings** Clean the prism carefully before applying the test sample. Apply enough sample to cover the prism (0.4 ml is sufficient)
Press the *Mes* key. The reading will be displayed within 2 seconds
Take successive readings to check repeatability, allowing the sample to reach prism temperature.
- Temperature** The prism temperature can be checked at any time by pressing the *Temp* key. A second press of the *Temp* key will change the display from °C to °F, or vice versa. Note, however, all measurements are automatically compensated to a reference temperature of 20.0°C, irrespective of the actual prism temperature.
- Changing the scale** Switch the instrument off.
Press and hold down both the *Zero Set* key and the *Sample Read* key and at the same time press the *On/Off* key to switch the instrument on.

Instrument Calibration

To set or check the instrument calibration, use the Zero sample shown in the Specification table overleaf. Zero Set & Check can be carried out on any scale.

'0'	use distilled or de-ionised water
'30'	use 30.00% $\%_{w/w}$ sucrose sample
'60'	use 60.00% $\%_{w/w}$ sucrose sample

- Zero set** Clean the prism thoroughly and apply the Zero sample.
Press and hold down the blank *Zero* key until $\square\square\square$ is displayed (about 5 seconds). Within 10 seconds, press and hold down the *Mes* key until $\square\square\square$ is displayed. This indicates the calibration (Zero Set) is complete.
- Zero check** With the Zero sample applied to a clean prism, press the *Zero* key. 'zero check' and the reading value will be displayed (with 0.01 resolution when using the Brix scale). If the reading flashes, a Zero Set is required.



Checking/Validating the Instrument

Periodically, you may wish to check the performance of your DR refractometer. This may be required as part of your Quality Management System. Suitable, certified calibration fluids for this purpose can be obtained from Bellingham+Stanley Ltd.



Battery Low symbol

When this symbol is shown in the top left hand corner of the display, the battery should be replaced. Fit a 9V battery type MNI 604, 6LR61 or PP3. Ensure that a good quality battery is used and it is inserted correctly. Do not allow moisture to enter the battery compartment. Re-fit the cover plate before using the instrument.



Warning!

Always check the relevant Material Safety Data Sheet for a sample before applying it to the refractometer. When applying samples that are harmful by skin or eye contact, wear appropriate protective clothing and glasses. Avoid unnecessary contamination of the refractometer by confining samples to the prism dish.



Caution!

The DR Digital 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 organic solvents. For example, avoid contact with solvents such as acetone and certain aromatic solvents. The prism dish is chrome-plated, which could be corroded by certain acids and salts.

Maintain your DR 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 soft case provided to protect the instrument.

Deterioration/loss of the display may be indicative of low battery power or too low ambient temperature. Do not persist in using the instrument with low battery power. Check/replace the batteries as necessary. If " $\square\square\square$ " is constantly displayed, contact B+S for advice.

If in doubt about the intended use of your DR, contact B+S for advice.

Certificate of Conformity

This Eclipse refractometer was tested and verified by Bellingham + Stanley Ltd. and has been found to meet the published specifications for this instrument.

For the refractometer to continue to operate within our specifications, it should be kept in a clean condition and well maintained in accordance with this instruction sheet.

Bellingham + Stanley Ltd.

This certificate implies no responsibility by Bellingham + Stanley Ltd. with regard to the accuracy of the instrument after the date of examination at Bellingham & Stanley Ltd.