

2

2 3

3

3

4

MANUAL for DIGITAL REFRACTOMETER

Directory				
1.	Introduction			
2.	Display and buttons			
3.	Preparations before operating			
4.	Boot and measure			
5.	The calibration			
6.	Scales converting and temperature systems converting			
7.	Turn it off			
8.	Maintenance and preservation			
9.	Appendix 1: Performance and error codes			
10.	Appendix 2: Models and specifications			

1. Introduction

Portable Digital Refractometers are microprocessor-based with laboratory accuracy to be able to accurately and instantly measure the refractive Index (RI), concentration and other parameters for many kinds of liquids. They are user-friendly and feature a display field as well as an automatic temperature compensation system, including 6 series and 12 models. Compared with the traditional hand-held ones they are faster, more accurate, and precise in terms of measurements. As to the details for series and models please refer to the Appendix 2.

1.1 Panel descriptions



1. Stainless Steel Sample Plate 2. LCD Display Screen 3. Keypad 4. Prism 5. Battery Compartment 6. Removable Shell 7. Cover



1.2 Host and spare parts

This instrument includes 1 set of host, 1 dropper, 1 removable shell and 1 AAA 1.5V battery. *Before operating your instrument, please read this manual thoroughly.*

2. Display Areas and Buttons

2.1 Display

This LCD screen has three main display areas, i.e. the host display area, temperature display area, and muti-function display area. *Please see Figure 2.1* and the following description:



- 1. Battery volume unit
- 2. Host display area
- 3. % or ‰ unit
- 4. Refractive index (RI) unit
- 5. Temperature display area
- 6. Multi-function display area

Note: Battery volume indicators:

Battery Volume	Battery Volume Indicators
80-100 %	700 1
50-80 %	ЭÞ
20-50 %	Ð
20 %	•



2.2 The Buttons

The refractometer has three buttons respectively:

1. The "Read" button: for booting / measuring

2. The "Cal" button: for entering the mode of calibrating "Zero Point"

3. The "Scale" button: for converting different scales/ temperature systems between Celsius and Fahrenheit



3. Preparations before operating

3.1 Install the Battery

- 1. Open the battery cabin by pushing the cover's lock key in the direction of the arrow showing, *please see the Figure 3.1.1*
- 2. Refer to the *Figure 3.1.2* to put 1 x 1.5V battery into the cabin, ensuring that the electrode side correspond with the correct polesand close the cabin agai *See Figure 3.1.2*.





3.2 Install the wrist strap

Install the wrist strap into the hole at the bottom of the instrument, referring to Figure 3.2.1.



Figure 3.2.1

4. Booting and Calibration

4.1 Booting

Press "Read" button for 1 second, the instrument will switch on and start booting the system. *Please see Figure 4.1.1.*



Figure 4.1.1

1. The multi-function display area will show the current scale number. for example: S01 indicates the first scale.

- When it is used outdoors, please avoid strong sunlight to ensure optimal measurement accuracy, otherwise please install the removable shell and close the cover to avoid exposure to sunlight
- 3. Before dripping into the sample liquid, please clean the sample plate with a soft clean cloth or soft paper.
- 4. Please keep the instrument in a stable and still position.
- Please ensure that instrument, ambient temperatures and samples are kept at the same temperature level before measuring.

Note:



4.2 Calibration

- 1. Drip 4 ~ 5 drops of distilled water into sample plate
- Press "CAL" button for 2-3 seconds until the 'CAL' is flashing, please see Figure 4.2.1
- 3. Press "CAL" button once again during the 'CAL' flashing, see the display as shown in Figure 4.2.2. Calibration procedure is over, the value should now be 0.0%, see Figure 4.2.3.

If operations fail to occure after 10 seconds, the instrument should be returned to booting status.

If calibration procedure fails, the multi-function display area will show an error code. *Please see Figure 4.2.4.*

Note:

- If multi-function area show code A01, that the calibration temperature exceeds the set limit. Other error codes can be checked in the Error codes table.
- 2. Instrument supports calibration with distilled water only.







Figure 4.2.2



Figure 4.2.3



Figure 4.2.4



5. Measurement

After the calibration, clear the distilled water and dry the sample plate, drip $4 \sim 5$ drops of sample and immediately press the "Read button" for 1 second.

After automatic temperature compensation, the instrument will give the current value accordingly, *please see Figure 5.1*.

If exceeding the measuring scope, 'HHH' or 'LLL' will show in the host display area, *please see Figure 5.2 and Figure 5.3*.

If you press the "Read" button for 2 seconds, the instrument automatically performs measurements based on preprogrammed times (default 15 times), the final value is the average of the 15 measurements, *please see the Figure 5.5.* After measurements, the multifunctions display area will return back to showing scale mode status.

Note: multi-function area will show remaining time during the automatic measurement procedures.



Figure 5.1



Figure 5.2



Figure 5.3

Figure 5.4



6. Scales converting and temperature systems converting

6.1 Scales converting

Pressing the "Scale" button each second can convert the scales and the values, as shown in *Figure 6.1.1*.





6.2 Temperature Converting System

The meter offers the two temperature units Celsius (0.0 \sim 50.0°C) and Fahrenheit (32.0 \sim 122.0°F)

 $\ensuremath{\mathsf{Press}}$ "Scale" button for 2 seconds, and the temperature unit will be converted.

If the temperature limitations are exceeded, the display shows "HHH" or "LLL", *please see Figure 6.2.2 and Figure 6.2.3*



Figure 6.2.1





<u>ansi (((</u>[

Figure 6.2.2

Figure 6.2.3



7. Turn off the instrument

If the instrument has not been used for 1 minute, it will automatically turn itself off.

8. Maintenance and Storage

- 1. Please clean and wash the sample plate with distilled water and dry it with a soft cleaning cloth or paper towel after each use
- 2. Never leave remains and residuals of samples in the sample plate for long periods of time
- 3. After finishing measurements of the corrosive liquid, please clean the sample plate immediately to avoid irreparable damage of the prism and metal surface of the plate
- 4. Please use a soft cleaning cloth or paper towel to clean the sample plate to avoid scratching the surface glass
- 5. Keep the pipette and cleaning cloth dry and clean during storage
- If the instrument is not to be used for a long period of time, please remove the battery, and store it in a cool and dry environment

	Range	Accuracy	Resolution
Tomporaturo	0,0-50,0°C	±0,5°C	0,1°C
lemperature	32,0-144,0°F	±0,9°F	0,1°F
Dimensions	121 x 58 x 25 (mm)		
Net weight	90 g (battery not included)		

9. Appendix 1

10. The error codes table:

Error code	Instructions
A01	Beyond the scope of calibration temperature. (0,0 °C-40,0°C)
A02	During calibration, no solution or solution wrong.
A03	This instrument has a hardware failure.

For veterinary use only

Cat. No 290015

