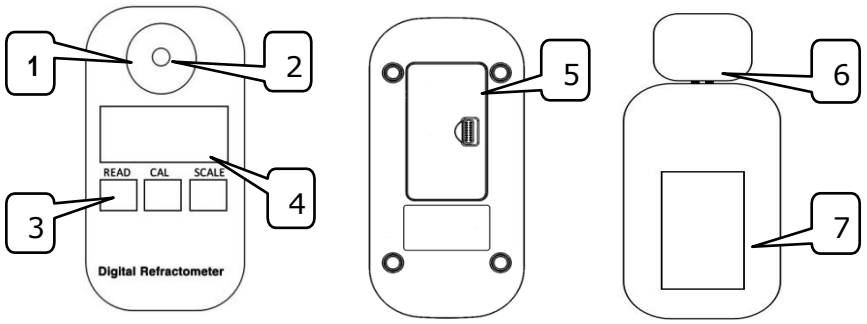
MANUAL for DIGITAL REFRACTOMER

Directory

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, which also have a friendly operation pattern and display field as well as an automatically temperature compensation system, including 6 series and 12models , comparing with the traditional hand held ones they are much faster, more accurately, and clearly in measurements, as to the details for series and models please refer to the Appendix 2.

1.1 Panel descriptions



P1.1

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

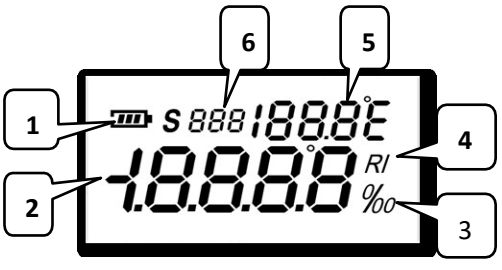
1.2 Host and the spare parts

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 properly.**

2. Display Areas and Buttons

2.1 Display

This LCD screen has three main display areas, which are host display area, temperature display area, and muti-function display area and others, please see the P2.1 and the following description:



P 2.1

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: the battery volume signs' table:

Battery Volume	Battery Volume Signs
80%-100%	
50%-80%	
20%-50%	
20%以下	Flashing

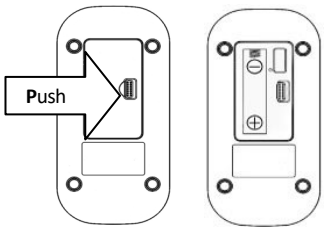
2.2 The buttons

P2.2.1

Three bottons on the meter. They are:
1. The “Read” button: for booting / measuring.
2. The “Cal” button: for entering the model of calibrating “Zero Point”
3. The “Scale” button: for converting different scales / converting temperature systems between Celsius and Fahrenheit.
   All the details please referrer to the P2.2.1.

3. Preparations before operating

3.1 Install the battery

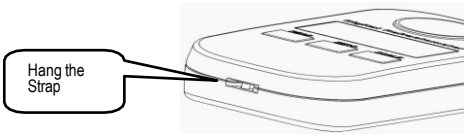


P3.1.1 P3.1.2

1. Open the battery cabin by pushing the cover’s lock key along the direction of arrow showing, please see the P3.1.1
2. Refer to the P3.1.2 to put 1 piece of 1.5v battery into the cabin in a proper electrode side and recover the cabin again.

3.2 Install the wrist strap

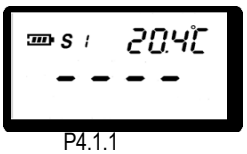
Properly Install the wrist strap into the hole at the bottom of the instrument, referring to the figure P3.2.1 .



P3.2.1

4. Booting and Calibration

4.1 Booting

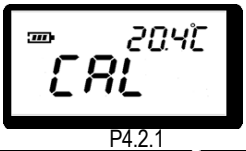


P4.1.1

Press "Read" button for 1 second , the instrument would switch on and start boot.
Please see the P4.1.1.

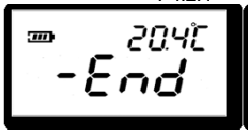
Note: 1.The multi-function display area would show the current scale number.
for example: S01 is expressed for the fist scale.
2. When it is used outdoors, please avoid the strong sunlight to lest affecting measurement accuracy, otherwise please install the removable shell and close the cover to resist the strong light.
3. Before dripping into the sample liquid, please clean the sample plate with soft clean cloth or soft paper.
4. Please keep the instrument in a stable and still statement and position.
5. Please ensure instrument, environment and sample are in the same temperature level before measuring.

4.2 Calibration



P4.2.1

1. Drip 4 ~ 5 drops of distilled water in sample plate.
2. Press “CAL” button for 2-3 seconds till see the ‘CAL’ flashing , plese see the P4.2.1 shows.
3. Press "CAL" button once again during the ‘CAL’ flashing, see the display as shown in the P4.2.2, the calibration is over, the value would be 0.0%, see the P4.2.3. If no any operations for 10seconds the instrument would return back to booting status.



P4.2.2

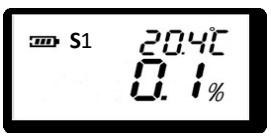
P4.2.3

If fail to complete the calibration, multi-function display area would shows an error code. plese see the P4.2.4 shows.

P4.2.4

Note: 1. If multi-function area show code A01 that means calibration temperature exceed the limitations, other error codes could be checked in the appendix error code page.
2. Instrument support only distilled water calibration.

5. Measurement



After the calibration, clear the distilled water and dry the sample plate, drip 4 ~ 5 drops of sample, Press quickly 1 second the "Read" button, the instrument would give the current value accordingly. After automatic temperature compensation, please see the P5.1, If exceeding the measuring scope, ‘HHH’ or ‘LLL’ would shows in the host display area, please see the P5.2 and P5.3.

P5.1

P5.2 P5.3

If press the "Read" button for 2 seconds, the instrument would make the automatic measurements upon programmed times (default 15times), the final value is the average of 15 times' measurements, please see the P5.5. After measurements, the multi-functions display area would return back to scale shows status.

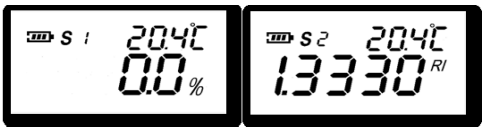
P5.5

Note: multi-function area would show remaining times during the automatic measurement.

6. Scales converting and temperature systems converting

6.1 Scales converting

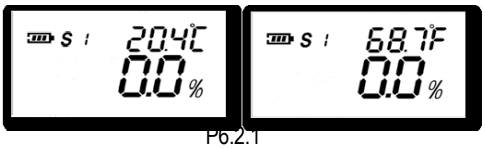
The meter offers maximum 10 scale marks measure scale: Press the "'Scale" Button each second can convert the scales and the values,
Please see as shown in figure P6.1.1.



P6.1.1

6.2 Temperature system converting

The meter offers temperature units which
Are Celsius (0.0 ~ 50.0 ℃) and Fahrenheit (32.0 ~ 122.0 °F)
Press "Scale" button for 2 seconds, temperature unit would be converted.



P6.2.1

If exceed the temperature limitations, the signs "HHH" or "LLL" would shows, please see the P6.2.2 and P6.2.3

P6.2.2 P6.2.3

7. Turn off the instrument

If without any operations for 1 minute, the instrument would be automatically shut off.

8. Maintenance and preservation

1. Please clean and wash the sample plate with distilled water and dry it with soft cleaning cloth or paper towel after finishing the measurement of one kind sample.
2. Never left the remains and residuals of samples in the sample plate for long time.
3. After finishing measurements of the corrosive liquid, please clean the sample plate as quick as possible to avoid the irreparable damage of the prism and metal surface of the plate.
4. Please use soft cleaning cloth or paper towel to clean the sample plate to avoid scribing the prism's glass,
5. Keep dropper and cleaning cloth to be clean and dry under the preservation.
6. If no using the instrument for a long time, please remove the battery, and preserved in a cool and dry environment.

9. Appendix 1

Performance:

	Range	Accuracy	Resolution
Temperature	0.0~40.0℃	±0.5℃	0.1℃
	32.0~104.0°F	±0.9°F	0.1°F
Dimensions	121 x 58 x 25(mm)		
Net weight	90g (battery not included)		

The error codes table:

Error code	Instructions
A01	Beyond the scope of calibration temperature.（0.0℃~40.0℃）
A02	During calibration, no solution or solution wrong.
A03	This instrument has a hardware failure.

<
10. Appendix 2

Models and specifications (continued)

Series	Model	Scales	Scales Nos.	Range	Resolution	Accuracy
Brix	HPC001	Brix	S01	0.0-50.0%	0.1%	±0.2%
		Refractive Index	S02	1.3330-1.4200nD	0.0001nD	±0.0003nD
	HPC002	Brix	S01	0.0-90.0%	0.1%	±0.2%
		Refractive Index	S02	1.3330-1.5177nD	0.0001nD	±0.0003nD
	HPC003	Dextran	S01	0.0--10.6%	0.1%	±0.2%
		Fructose	S02	0.0--68.9%	0.1%	±0.2%
		Glucose	S03	0.0--59.9%	0.1%	±0.2%
		Lactose	S04	0.0--16.5%	0.1%	±0.2%
		Maltose	S05	0.0--15.60%	0.1%	±0.2%
		Refractive Index	S06	1.3330-1.4200nD	0.0001nD	±0.0003nD
Salinity	(sodium chloride (NaCl)	Salinity	S01	0.0--28.0%	0.1%	±0.2%
		Salinity	S02	0--280‰	1‰	±2‰
		Specific Gravity	S03	1.000-1.217	0.001	±0.002
		Refractive Index	S04	1.3330--1.3900nD	0.0001nD	±0.0003nD
	(sea water)	Salinity	S01	0--100‰	1‰	±2‰
		Chlorinity	S02	0--57‰	1‰	±2‰
		Specific Gravity	S03	1.000-1.070	0.001	±0.002
		Refractive Index	S04	1.3330--1.3530nD	0.0001nD	±0.0003nD
Honey		Brix	S01	0.0--90.0%	0.1%	±0.2%
		Water	S02	38.0%-5.0%	0.1%	±0.2%
		Be'	S03	33.0-48.0	0.1	±0.2
		Refractive Index	S04	1.3330--1.5177nD	0.0001nD	±0.0003nD
Wine	HPC004	Brix	S01	0.0-45.0%	0.1%	±0.2%
		%VOL ap	S02	0.0-22.0%	0.1%	±0.2%
		Oe	S03	3-150	1	±2%
		KMW	S04	0.0-25.0	0.1	±0.2
Clinical		URINE SP. G.	S01	1.000-1.050	0.001	±0.002
		SERUM P.	S02	-0.1-12.0	0.1	±0.2
		Refractive Index	S03	1.3330--1.3900nD	0.0001nD	±0.0003nD
Car		Cleaner	S01	(0)—(-40)℃	0.1℃	±0.5℃
		Ethylene Glycol	S02	(0)—(-50)℃	0.1℃	±0.5℃
		Propylene Glycol	S03	(0)—(-50)℃	0.1℃	±0.5℃
		Battery	S04	1.000—1.500sg	0.001	±0.005sg
	(Urea Tester)	Urea (NH2)2C0	S01	0-51.0%	0.1%	±0.2%
		Refractive Index	S02	1.3330--1.4056nD	0.0001nD	±0.0003nD
	(Engine Coolant Tester)	Ethylene Glycol (v/v)	S01	0-60%	0.10%	±0.5%
		Ethylene Glycol (℃)	S02	(0)—(-50)℃	0.1℃	±0.5℃
		Propylene Glycol (v/v)	S03	0-70%	0.10%	±0.5%
		Propylene Glycol (℃)	S04	(0)—(-60)℃	0.1℃	±0.5℃
	(Brake Fluid Tester)	DOT3	S01	(121)—(260)℃	1℃	±10℃
		DOT4	S03	(125)—(275)℃	1℃	±10℃
		Refractive Index	S04	1.3330--1.5177nD	0.0001nD	±0.0003nD