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**ISQ-DRM31  
DIGITAL REFRACTOMETER  
OPERATION MANUAL**

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## 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.

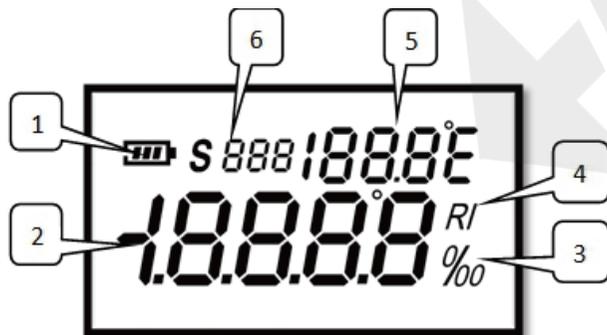
### 1 Host and the spare parts

This instrument includes 1 set of host, 1 dropper, 1 removable shell, 1 Covers and 1 AAA 1.5v battery.  
Before operating your instrument, please read this manual properly.

## Display Areas and Buttons

### 1 Display

This LCD screen has three main display areas, which are 3 host display area, temperature display area and multi-function display area .



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% below      | Flashing             |

### 2 The buttons

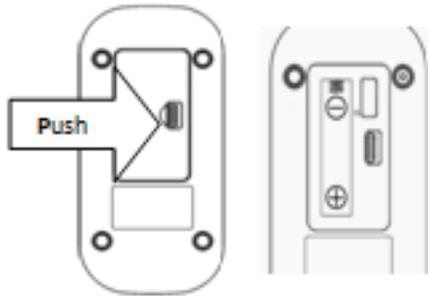
This instrument has three buttons, respectively is:

1. The "READ" button: for booting / measuring.
2. The "ZERO" button: for entering the model of calibrating "Zero Point"
3. The "°C/°F" button: for converting different scales / converting temperature systems between Celsius and Fahrenheit.

## Preparations before operating

### 1 Install the battery

1. Open the battery cabin by pushing the cover's lock key along the direction of arrow showing.
2. Put 1 piece of 1.5v battery into the cabin in a proper electrode side and recover the cabin again.



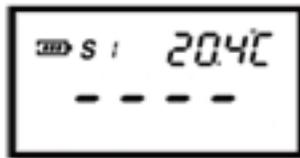
- ② Install the wrist strap  
Properly Install the wrist strap into the hole at the bottom of the instrument.



### Booting and Calibration

① Booting

Press "READ" button for 1 second , the instrument would switching on and booting.

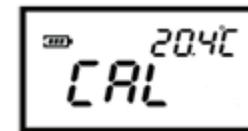


◆ Note:

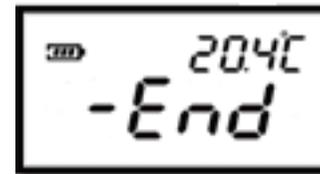
1. The multi-function display area would show the current scale number. for example: S01 is expressed for the first scale.
2. Before dripping into the sample liquid, please clean the sample plate and prism with soft clean cloth or soft paper.
3. Please keep the instrument in a stable and still statement and position.
4. Please ensure instrument, environment and sample are in the same temperature level before measuring.

② Calibration

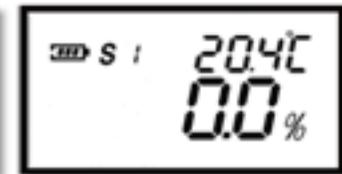
1. Drip 4 ~ 5 drops of distilled water in sample plate.
2. Press "ZERO" button for 2-3 seconds till see the 'CAL' flashing



3. Press "ZERO" button once again during the 'CAL' flashing, see the display as shown in the P1, the calibration is over, the value would be 0.0%, see the P2.



P1



P2

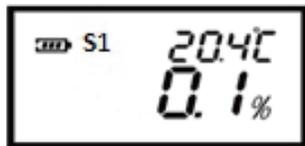
If no any operations for 10seconds , the instrument would return back to booting status. If fail to complete the calibration, multi-function display area would show an error code.



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

**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.



If exceeding the measuring scope, 'HHH' or 'LLL' would show in the host display area.

- ◆ Note:
 

Because of the fine particles inside the coolant, there will be slight particle precipitation covering the surface of the test port prism during the measure process, and the value will fluctuate slightly in the continuous measurement, which is a normal phenomenon, and the measurement can be repeated by averaging the method to ensure the accuracy of the measurement.



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.



After measurements, the multi-function display area would return back to scale showing status.

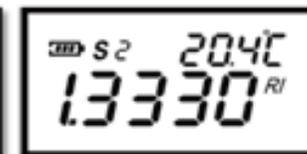
- ◆ Note:
 

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

**Scales converting and temperature systems converting**

① Scales converting

This instrument could support 10 scales in the largest. Pressing the "C/F" button each second can convert the scales and the values.

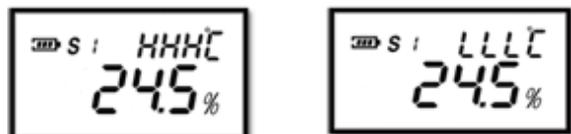


② Temperature system converting

This instrument supports two temperature units which are Celsius (0.0 ~ 40.0 °C) and Fahrenheit (32.0 ~ 104.0 °F). Press “C/°F” button for 2 seconds, temperature unit would be converted.



If exceeding the temperature limitations, the signs “HHH” or “LLL” would shows.



**Turn off the instrument**

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

**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 leave 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 preserve it in a cool and dry place.

**Appendix**

① Performance

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

② Temperature system converting

| Error code | Instructions   |
|------------|--|
| A01        | Beyond the scope of calibration temperature.<br>( 0.0°C~40.0°C ) |
| A02        | During calibration, no solution or solution wrong.               |
| A03        | This instrument has a hardware failure.                          |