

5013-E08



How to Get Extended warranty 1 year → 2 years

The warranty period will be extended from 1 year to 2 years when you register your information.



Trouble scanning the code? Access this link <https://www.atago.net/ur/index.php?l=en>

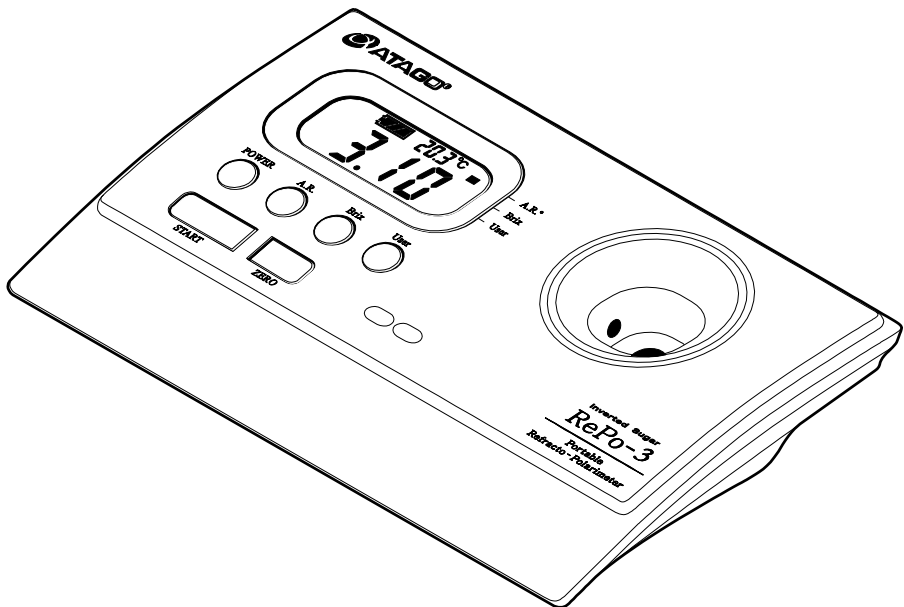
QR code

Portable Refracto-Polarimeter

# RePo-3

Instruction Manual

Cat. No. 5013

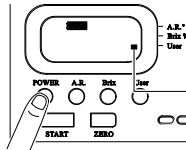




# Quick Manual

## 1 Powering on (☞ page 4)

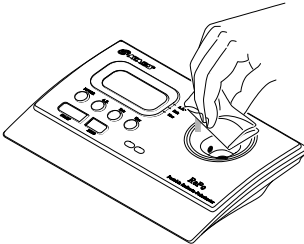
- ① Press **POWER**.



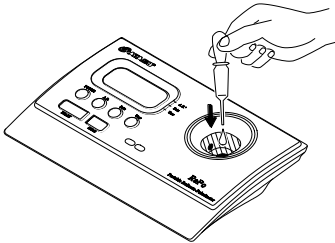
The cursor indicates the last used scale.

## 2 Zero setting (☞ page 5)

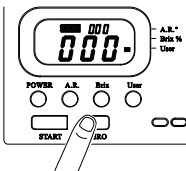
- ① Wipe the sample stage clean.



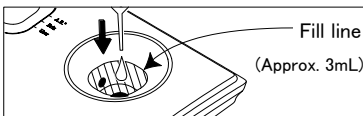
- ② Fill the sample stage with water up to the fill line.



- ③ Press **ZERO**.  
**000** is displayed.

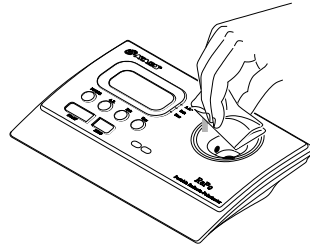


Sample volume

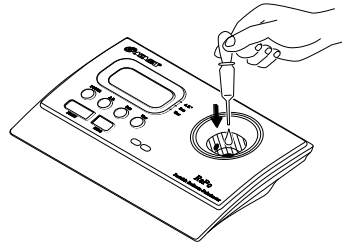


## 3 Measurement (☞ page 6)

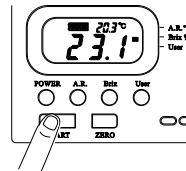
- ① Wipe the sample stage clean.



- ② Fill the sample stage with the sample solution up to the fill line.



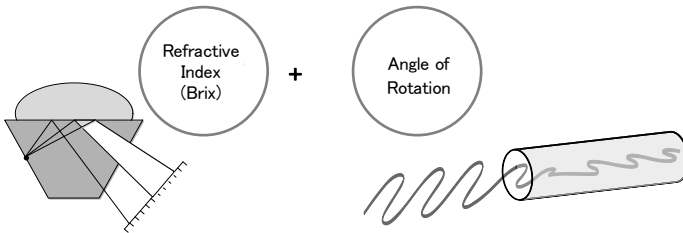
- ③ Press **START**.  
The measurement value is displayed.



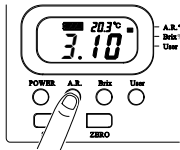
**memo** See page 7 for cleaning tips.

# Main Features

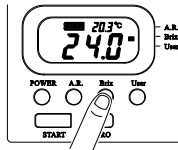
## Dual-purpose: Refractive Index (Brix) and Angle of Rotation Measurements



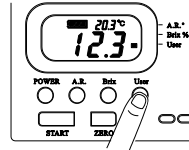
## Multi-scale: Angle of Rotation; Brix; Invert ratio (%) at Invert sugar



Angle of Rotation



Brix (%)



Press **User** Invert ratio (%) at Invert sugar.

# Useful Features

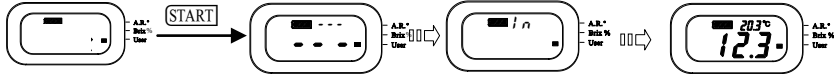
## Turn on Backlight

Backlight stays on for 1 minute after any button is pressed.

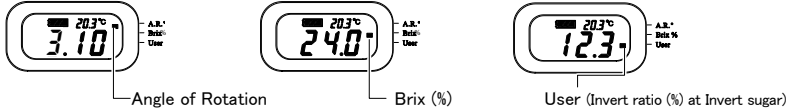


## View Scale Information

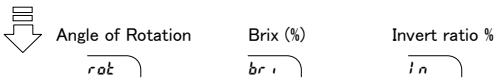
During measurement: Press START to display the scale name abbreviation next to the battery indicator.



After measurement: The cursor indicates the last used scale.



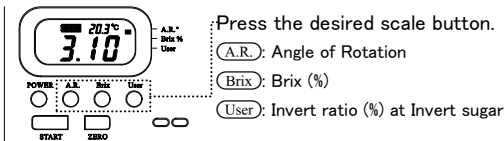
After measurement: Press one of the scale buttons to display the following scale name abbreviation next to the battery indicator.



Then, the measurement in the selected scale is displayed.



## Change Scale



# Contents

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# Precautions for use

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## Introduction

Thank you for purchasing the instrument. Carefully read and follow all instructions. Keep this manual for future reference.

## Safety Instructions

Read and follow all safety instructions before operating the instrument.

Failure to comply with the following instructions may result in personal injury or property damage.

### WARNING

- Ensure safety when handling hazardous materials. Observe precautionary measures and use protective equipment. Be aware of the hazards of such chemicals and emergency response guidelines.
- ATAGO may not be held liable for any injury or damage arising in connection with handling of hazardous materials during the use of the instrument.
- Do not drop the instrument or subject it to strong physical shock.
- Do not attempt to repair, modify, or disassemble the instrument.

### CAUTION

- Carefully read this manual to have basic knowledge of the function of each component.
- Some acids may corrode the glass prism, optical path window, and/or (metal) sample stage, which may cause erroneous measurements.
- Do not use metal tools, such as a spoon, as they may scratch the prism or the optical path window, resulting in erroneous measurements.
- Only use the specified battery type. Observe proper polarities, properly aligning the anodes and cathodes.
- Store the instrument away from direct sunlight/heat sources and excessive amounts of dust/debris.
- Store the instrument in a dry environment.
- Do not expose the instrument to a rapid change in ambient temperature.
- Do not subject the instrument to strong vibration.
- Do not subject the instrument to extreme cold temperature.
- Do not place the instrument under anything heavy.
- Have the batteries and battery compartment cover removed during air transport.

## <Chemical Resistance of Body Case>

- The body case is made of ABS resin. Do not expose it to water vapor or solvents.

Aqua regia / chromic acid / chlorosulfuric acid / hydrobromic acid / nitric acid / hydrofluoric acid / sulfuric acid / phosphoric acid / ethyl acrylate / butyl acrylate / ethyl acetoacetate / acetophenone / benzyl benzoate / ethylbenzene / ethylene oxide / ethylenediamine / ethylene chlorohydrin / epichlorohydrin / ethyl chloride / benzyl chloride / methyl chloride / chlorinated solvents / xylene (xylo) / cresol / chloroacetone / chlorotoluene / chloroform / acetic acid / amyl acetate / isopropyl acetate / ethyl acetate / butyl acetate / propyl acetate / methyl acetate / diphenyl oxide / diisopropyl ketone / carbon tetrachloride / dioxane / cyclohexanone (anone) / dichlorobenzene / dibutyl phthalate (DBP) / dimethylformamide (DMF) / dimethylaniline / phenol / thioalcohol (mercaptan) / tetrahydrofuran (THF) / trichloroethylene / toluene (toluol) / ethylene dichloride / dichloromethane / nitroethane / nitropropane / nitrobenzene / nitromethane / perchlorethylene / fluorobenzene / methyl methacrylate / methyl isobutyl ketone / methyl ethyl ketone / monochloroacetic acid / monochlorobenzene / liquid chlorine / thionyl chloride / sodium peroxide / bromine / benzene / lacquer

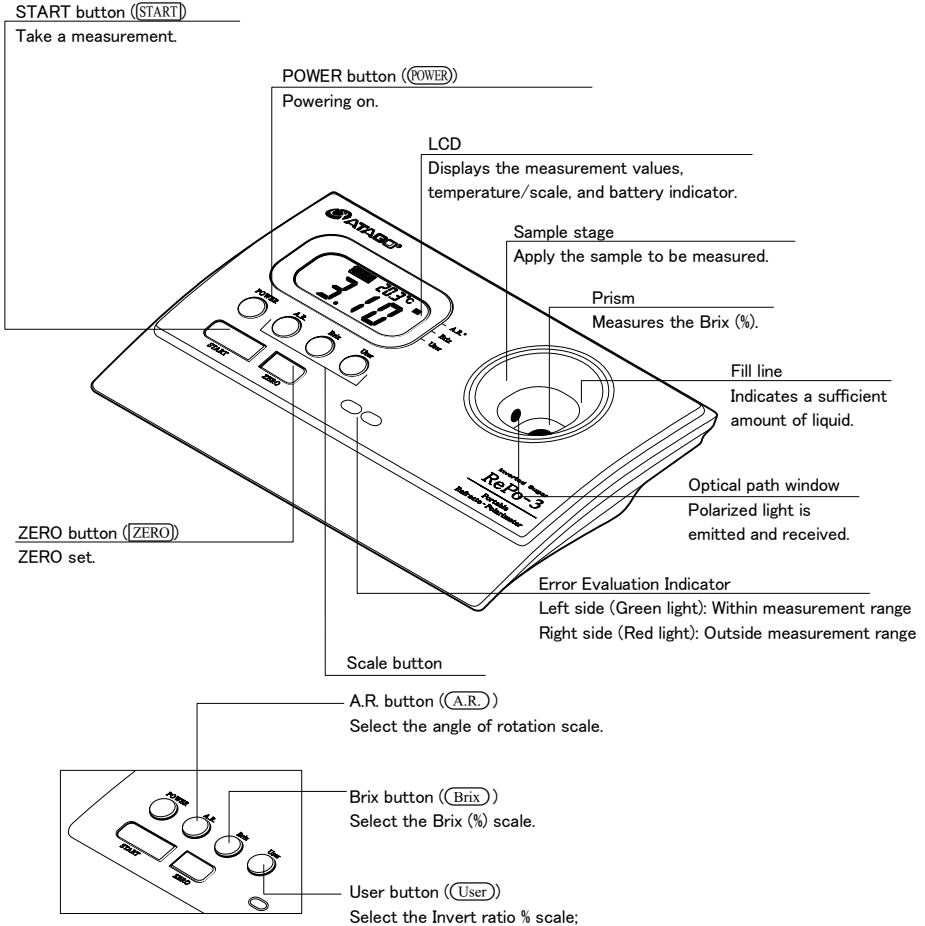
**Note** Solvents that are harmful to the plastic body case include but are not limited to the above substances.

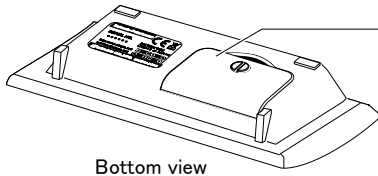
# 1. Overview

## 1. Contents

- Main unit ..... 1
- Instruction Manual (this book) ..... 1
- AAA batteries ..... 4

## 2. Components and Functions

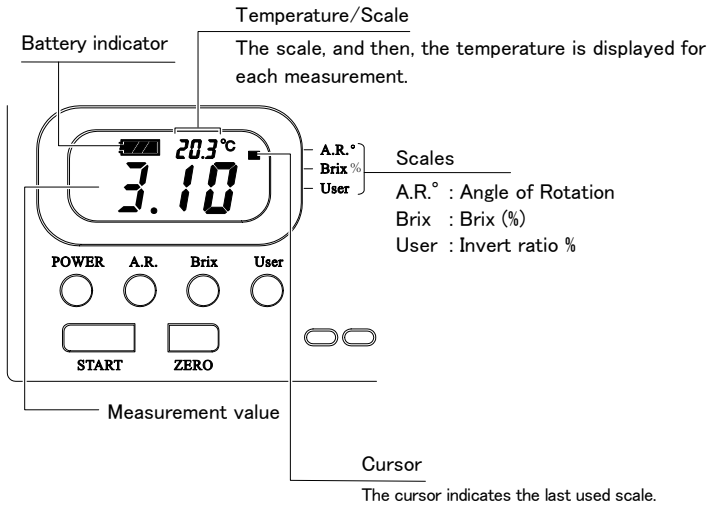




Battery compartment  
Place and remove batteries from here. (👉 page 4)

Bottom view

LCD

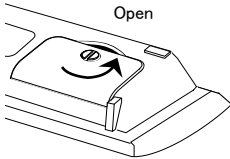


### 3. Battery Replacement



- When the battery icon indicates the low power level (🔋), replace all four batteries with a brand new set of AAA alkaline batteries (1.5V).
- Check the expiration dates on batteries before purchase.
- Remove the battery from the unit when the unit is not to be used for a month or so.

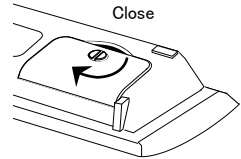
① Turn the screw counterclockwise with a flat-head screwdriver or a coin to open the battery compartment.



② Insert the batteries, observing the correct polarity.

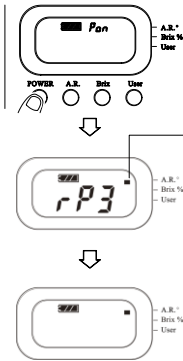


③ Close the battery compartment and turn the screw clockwise.



### 4. Power ON/OFF

Powering on



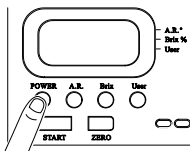
① Press **POWER**.

The backlight stays lit for 1 minute.

The cursor indicates the last used scale.

**memo** The backlight stays on for 1 minute after any button is pressed.

Powering off



① Hold down **POWER**.

The screen will turn off.

**memo** The instrument will turn itself off after 4 minutes of inactivity.

## 2. Basic Operations

### ⚠ CAUTION

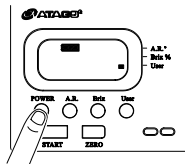
- Operate away from direct sunlight at a stable temperature with as little fluctuation as possible.
- Acclimate both the instrument and sample solution to room temperature to ensure accurate results. Measurements may fluctuate with hot or cold samples. Wait to press **START** after placing the sample on the prism. Alternatively, press **START** multiple times.
- Operate on a flat work surface.
- The displayed temperature is that of the prism and may not necessarily match the temperature of the sample.

## 1. Zero-setting

This is the operation to set the calibration point (zero) for optical rotation and Brix.

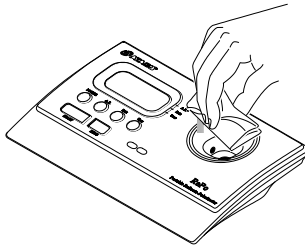
**Note** Zero-set the instrument at the beginning of each day before use.

**Note** Regular zero-setting throughout the day is recommended to ensure accurate results.

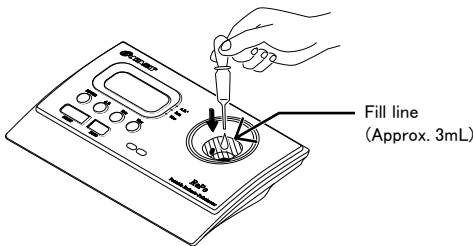


① Press **POWER** to turn it on.

**Note** Optical rotations and Brix can be zero-set in any scale, however, when the optical rotation scale is selected, even when Brix zero-set is an error, no error message will display.

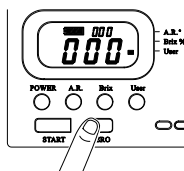


② Wipe the sample stage clean.



③ Fill the sample stage with tap water up to the fill line.

**memo** Use room temperature tap water. The instrument should also be acclimated to room temperature prior to operations.

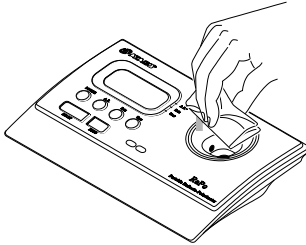


④ Press **ZERO**.

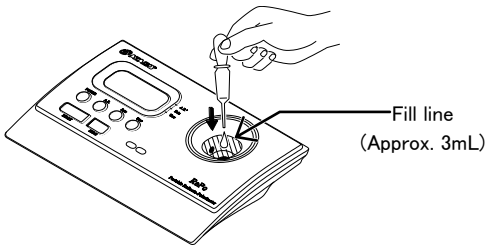
**000** flashes and stops.

**memo** To perform zero-setting on the optical rotation scale and check whether Brix zero-setting was done correctly, press **Brix** and check that 000 is displayed.

## 2. Measurements



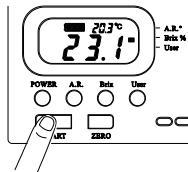
① Wipe the sample stage clean.



② Fill the sample stage with the sample solution to the fill line.

**MEMO** Measure room temperature (distilled) samples. The instrument should also be acclimated to room temperature prior to operations.

**MEMO** Try stirring the sample on the sensor during measurement to improve the repeatability of oily/fatty samples.



③ Press **START**.

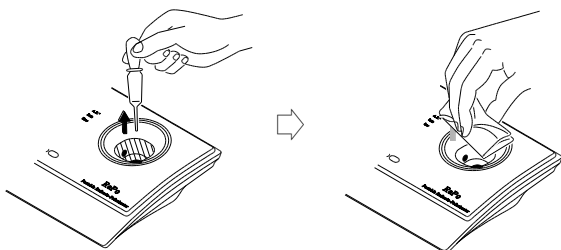
-- flashes, and then the scale name is displayed next to the battery indicator.

Then, the measurement value and temperature will be displayed.

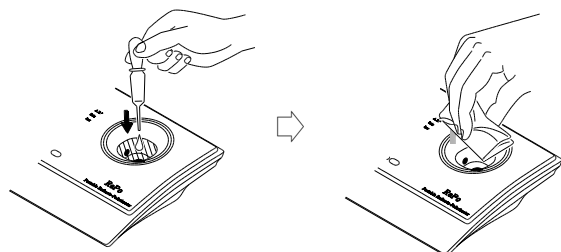
### 3. Cleaning

#### ⚠ CAUTION

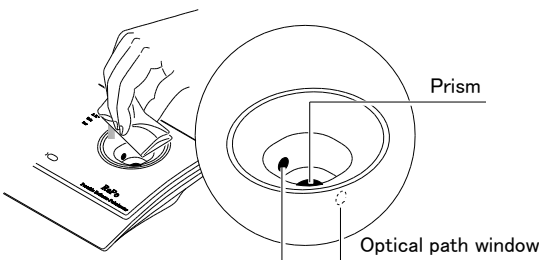
- Ensure that the sample stage is clean before measurement.
- Clean the sample stage immediately after each measurement.
- Thoroughly dry the instrument before storing.
- Do not use benzene (paint thinner) on the instrument.
- Store away from direct sunlight at a stable temperature with as little fluctuation as possible.



① Collect the sample solution with a pipette and wipe it off.



② Apply some water and wipe it off.



③ Dry the sample stage completely with dry tissues.

**memo** Clean the prism and the optical path window particularly well.

#### For oily samples

Clean oily residues with ethyl alcohol or mild soap, and then, rinse with water.



Mild soap



Ethyl alcohol

Can be washed under running water. Thoroughly dry the instrument before storing.

**memo** Moisture may accumulate in the grooves of the buttons, but this will not affect the instrument.

## 4. Scales

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### ANGLE OF ROTATION – denoted by “ $\alpha$ ” and expressed in degrees (“°”)

The rotation of polarized light is observed when polarized light that is oscillating unidirectionally rotates as it passes through a liquid. The measurement of the angle of such rotation is called the “Angle of Rotation.”

The angle of rotation is the basic numeric value measured by polarimeters and are dependent on the concentration of the liquid, the length of the observation tube, temperature, and the measurement wavelength.

The observation tube for the instrument is 20 mm long.

### Brix (%)

Brix represents the weight of sucrose in 100 grams of sucrose solution as percentage by weight. When other dissolved solids are present in the solution, Brix conversion may be applied.

Brix is a measure of the total dissolved solids in a solution and indicates the combined concentration of all soluble substances, such as sugar, salt, protein, and acids.

The readings are corrected, based on the temperature of the prism, within the automatic temperature compensation range.

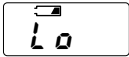
### Invert ratio %

Invert ratio % at Invert sugar (Sucrose → Invert sugar)

$$\text{Invert ratio \%} = \frac{\text{Invert sugar}}{\text{Invert sugar} + \text{Sucrose}} \times 100$$

## 5. Error Messages

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The battery power is low.



Not enough light could pass through the sample solution to take the angle of rotation measurement.

⇒ Dilute or filter the sample before measuring.



The sample measured above the measurement range.



Too much external light is interfering with the measurement.

⇒ Shade the sample stage with your hand and measure again.

\* This error message may also appear if the sample temperature is too low.



The sample measured below the measurement range.



Measurement error.

(When User scale is selected)

⇒ Press (A.R.) and (Brix) to view the detail of the error.



(ZERO) was pressed with nothing or something other than water on the sample stage. (When Brix or User scale is selected)



The sample measured below 3.9°C.

(Example)



The sample measured above 41.1°C.

(Example)

## 6. Inspection

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Regular inspection is recommended to ensure accurate results. Keep a regular schedule, such as the beginning of each month. Inspect the instrument as needed – when the instrument has been dropped, or the measurements seem to be abnormal.

The standard liquid is available from ATAGO.

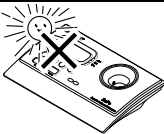
- RE-99110 RePo Standard liquid

<Inspection of the instrument with standard liquid>

- ① Prepare the instrument for basic operations according to the instruction manual.
- ② Zero set the instrument with room temperature distilled water.
- ③ Measure the Brix and Angle of Rotation of the standard liquid (2 or 3 times repeatedly).
- ④ If the measurements are within accuracy, the instrument is calibrated correctly.  
If the measurements are not within accuracy, review the procedures to measured correctly.

## 7. Storage and Maintenance

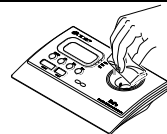
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Store the instrument in a dry place away from direct sunlight. Exposure to humidity and heat may damage the instrument.



Do not use organic solvents (paint thinner, benzene, gasoline, etc.) on the plastic body case. (☞ page 1)



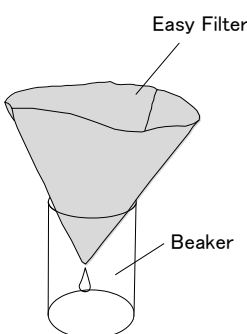
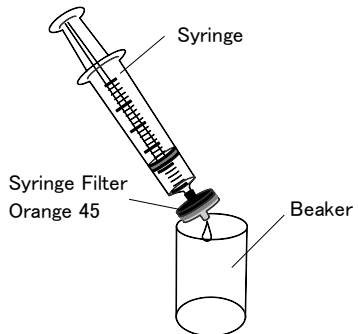
Clean and dry the sample stage thoroughly, following the "Cleaning" instructions. (☞ page 7)  
Store the unit away from direct sunlight at a stable temperature with as little fluctuation as possible.

## 8. Optional Accessories and Consumable Items

Contact ATAGO or your ATAGO distributor to place an order or for any inquiries.

Name	Part No.	Notes	
MAGIC™ for RePo	RE-79000		
Beaker 100mL	RE-79423	For sample filtration	
Easy Filter (100pcs)	RE-79422	For sample filtration	
Syringe Filter Orange 45 (100pcs)	RE-79420	For sample filtration (use with Syringe)	
Syringe 20mL (3pcs)	RE-79421	For sample filtration (use with Syringe Filter Orange 45)	
RePo Small Volume Adapter	RE-72093	For measuring small volume (0.6mL or more ) sample	
RePo Reduced Optional Path Adapter 5mm	RE-72094	For measuring at 5mm optical path	Set of RE-72095 and RE-72096
RePo Reduced Optional Path Adapter 5mm (Adapter only)	RE-72095		
RePo Reduced Optional Path Adapter 5mm (Glass Cell only)	RE-72096		
RePo Reduced Optional Path Adapter 10mm	RE-72097	For measuring at 10mm optical path	Set of RE-72098 and RE-72099
RePo Reduced Optional Path Adapter 10mm (Adapter only)	RE-72098		
RePo Reduced Optional Path Adapter 10mm (Glass Cell only)	RE-72099		
RePo Standard Liquid	RE-99110		

### How to Use the Sample Filters

Easy Filter	Syringe Filter
 <p>Easy Filter</p> <p>Beaker</p>	 <p>Syringe</p> <p>Syringe Filter Orange 45</p> <p>Beaker</p> <p><b>Note</b> Please be sure to tightly attach the syringe filter to the syringe.</p> <p><b>Note</b> When pushing sample through the filter, please hold the filter to avoid from separating from the syringe.</p>

**MEMO** For samples that take time to filter or require force when using the syringe filters, please filter them with the easy filters first.

## 9. Warranty and Repair

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The instrument is a precision electronic instrument that consists of optical and electronic parts.

When the interaction between light and electricity causes malfunction of the instrument, the source of the problem may be difficult to identify.

Repair and adjustment of the instrument require expertise in electronics and optics.

Only authorized service providers who have completed the maintenance training can disassemble and repair the instrument beyond the simple inspection and replacement of parts which are outlined in this manual.

### 1. Warranty

The instrument is warranted for one year from the date of purchase. This warranty is void if the instrument shows evidence of the following. Send the original batteries with the instrument if they are still in use.

- Having been disassembled by unauthorized personnel
- Having been misused and/or operated outside the environmental specifications
- Damages to prism, optical path windows, and/or sample stage
- Leakage from batteries other than those included with the unit
- Water damage or having been dropped

Repair services are available for a fee after the warranty expires.

Contact an ATAGO authorized service center for service and support.

### 2. Replacement Parts

Use only authentic parts to ensure the optimum performance of the instrument.

Replacement parts are generally available for 7 years after a model is discontinued.

Contact ATAGO, an authorized ATAGO distributor, or the original seller.

\* Replacement parts may become unavailable from the suppliers within the 7-year period.

Any repair services that require disassembly must be performed at an authorized ATAGO service center.

**Please have the serial number information ready when contacting a service center.**

## 10. Specifications

Product name	RePo-3
Measurement scales	Angle of Rotation (°), Brix (%), Invert ratio % at Invert sugar, Temperature (°C)
Measurement readings	Angle of Rotation (°), Brix (%), Temperature (°C) User (Invert ratio %) Brix (%) with Automatic Temperature Compensation
Measurement range	Angle of Rotation (°): -5.00 to +5.00° <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 0 10px;">           These ranges are measured by the device's 20mm light path.            These are convertible to below ranges:            -25.00° to +25.00° with a 100mm observation tube            -50.00° to +50.00° with a 200mm observation tube            Brix (%): 0.0 to 85.0%            Invert ratio %: 0.0 to 99.9%            Temperature: 10.0 to 40.0°C         </div>
Display range	Angle of Rotation (°): -5.99 to +5.99° Brix (%): -2.0 to 86.6% Invert ratio %: -2.0 to 102% Temperature: 4.0 to 41.0°C
Resolution	Angle of Rotation (°): 0.01° Brix (%): 0.1% Invert ratio %: 0.1% Temperature: 0.1°C
Measurement accuracy	Angle of Rotation (°): ±0.1° (at 20°C) Brix (%): ±0.2% Temperature: ±1.0°C
Repeatability	Angle of Rotation: ±0.05° (at 20°C) Brix (%): ±0.1%
Measurement time	12 seconds
Ambient temperature	15 to 40°C
Storage temperature	0 to 65°C
Temperature compensation range	Brix (%): 10 to 40°C
Sample volume	3mL
Measurement wavelength	589nm (equivalent to the sodium-D line spectrum)
Light source	LED
Power supply	Size AAA alkaline battery × 4
International protection class	IP67
Dimensions and weight	160 × 101 × 38mm, 325g (main unit only)

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## **ATAGO CO.,LTD.**

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