"Pocket" Cleaner Refractometer

PAL-Cleaner

Cat.No.4536

4536-E04

ATAGO®

Instruction Manual

Parts

GOOD DESIGN

LCD

Measurement results, prism temperature, and remaining battery charge are displayed.
The displayed value is an example.

START button

Press to take measurements and hold down to turn off the display.

Battery compartment

Place and remove batteries from here.

Sample stage

Apply water and samples on the glass prism located in the center of the sample stage.

ZERO button

Press to perform zero-setting.

Lanyard hole

Contents

◆ Main unit.....1 ◆ Instruction Manual (this book).....1 ◆ Calibration Report .. 1 ◆ AAA batteries 2

AAA alkaline batteries are included. Remove the tape from the battery compartment before inserting the batteries.

ATAGO instruments are rigorously inspected to ensure each unit meets the highest standards of quality assurance.

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.
◇ ATAGO is not liable for any loss and damage caused by the measurement and use of this instrument.
◇ Some acids may corrode the glass prism 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, resulting in erroneous measurements.
◇ Do not use water above 30℃ to rinse the instrument.
◇ 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.
◇ 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.
◇ Loosen the battery compartment cover for air transportation.

<International Protection Classification IP65>

◇ The instrument is water-resistant, not waterproof, and should not be submerged.

<Chemical Resistance of Body Case>

◇ The body case is made of ABS resin. Do not expose it to water vapor or solvents. See the list of "Solvents Harmful to Body Case."

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Zero-setting and Measurement

【Caution】 All operations are disabled while the prism LED is flashing.

Zero-setting

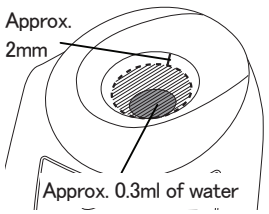
【Caution】

◇ Zero-set the instrument at the beginning of each day before use as well as after replacing the batteries.

◇ Let water on the prism acclimate to the temperature of the instrument before zero-setting.

◇ When "AAA" is displayed, wipe the prism clean, apply water, and press the ZERO button again.

1. Wipe the prism clean and apply about 0.3ml of tap/distilled water.



2. Press the START button to start measuring.

☞ Measurement

START ZERO

Stop taking measurements.

☞ How to stop measuring

3.

Measurement : not 0.00

Then press the ZERO button while the water is on the prism.

ZERO

Measurement : 0.00

The instrument is zero-set correctly.

4. Zero-setting is complete when "000" blinks twice and then stops.

Proceed to measurement.
Wipe the prism clean with tissue paper.

Measurement

【Caution】

◇ Do not use metal tools to apply samples on the prism as they may scratch the prism.

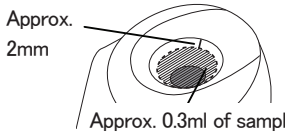
◇ Initial measurements may fluctuate with hot or cold samples. Wait for the instrument to acclimate to the sample temperature, approximately 20 seconds, to press the START button. Alternatively, press the START button multiple times until measurements become stable.

◇ Do not splash water above 30℃. The plastic may warp, which may compromise the water resistance.

- When measuring hot samples, place only the necessary amount and do not let it overflow from the sample stage well.
- When hot water is necessary to clean off hardened samples, use water-soaked gauze around the prism area and keep hot water away from the body case.

◇ The displayed temperature is that of the prism and may not necessarily match the temperature of the sample.

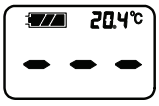
1. Wipe the prism clean and apply about 0.3ml of the sample.



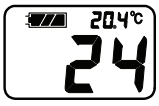
2. Press the START button.

START

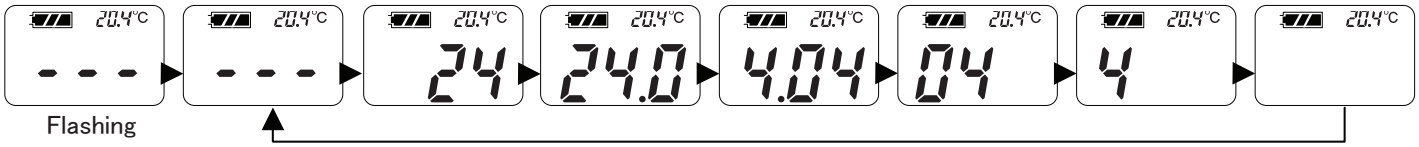
3. "---" flashes until measurements stabilize,



4. After "---" stops flashing, measurement results are displayed continuously.



<Continuous measurement display> Example: 24.04



Flashing

The instrument will turn itself off after 2 minutes of continuous measurement,

<How to stop measuring>

1. Hold down the START button.

START

2. Release once "StP" appears.
The last measurement is displayed.

The last measurement is retained for approximately 1 minute afterwards.

<How to turn off>

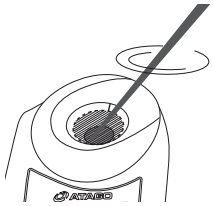
1. Hold down the START button.

START

2. Release once "OFF" appears after "StP."

<Tip for stable measurement>

This model features the Mode-S technology for increased repeatability. For best results measuring hot or cold samples, stop the measurement once measurements start to stabilize, and then press the START button again.



<For oily/fatty samples>

Try stirring the sample on the prism while measuring to improve the repeatability of oily/fatty samples.

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Cleaning

Wipe off the sample, rinse with water, and wipe off the water to clean the sample stage thoroughly. Dry the sample stage completely with dry tissues.

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

Error Messages

The following messages alert the user when an operation has failed.

The battery is low.

The ZERO button was pressed with nothing or something other than water on the prism.

The START button was pressed with nothing or an insufficient amount of sample on the prism.

The sample measured outside the measurement range.


Too much light is entering the prism, and the instrument cannot measure accurately.
(Shade the sample stage with your hand and take a measurement again.)

The prism temperature is below the temperature range.

The prism temperature is above the temperature range.

The instrument is faulty.
(Replace the batteries. Contact ATAGO if this error persists.)

Replacing the Batteries

【Caution】

◇ Fasten the battery compartment cover tightly to prevent water ingress or poor connection, which will cause erroneous measurements. Push the cover in firmly and turn.

◇ When the O-ring on the cover is dirty or damaged, the water resistance may be compromised. Lubricate the O-ring regularly (Figure 1)

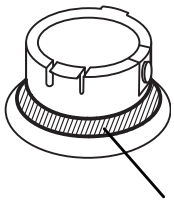
◇ When the battery icon indicates the low power level (), replace both batteries with a brand new set of AAA alkaline batteries (1.5V).

◇ Static images may occasionally appear on LCD. Such retained pixel charges do not indicate a faulty display, consume the battery power, or affect the instrument's performance in any way.

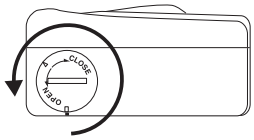
◇ Check the expiration dates on batteries before purchase.

◇ Zero-set the instrument after the batteries are replaced.

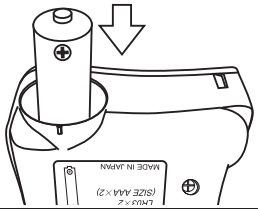
Figure 1



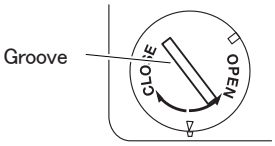
1. Insert a coin in the groove on the battery compartment cover. Turn the coin counterclockwise to remove the cover.



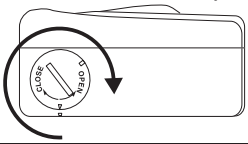
2. Insert batteries, observing the correct polarity.



3. Align the cover and push it down.



4. Close the battery compartment cover by pushing the cover in with a coin in the groove and turning it clockwise until it stops.



Solvents Harmful to Body Case

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 (xylol)／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

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

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Measurement Value

This unit converts refractive index into TDS (total dissolved solids) for convenient concentration measurements of industrial wash solutions.
The relationship between the concentration of cleaner and its refractive index differs with each type of cleaner.
Therefore, to determine the concentration of each type of cleaner, each solution should have its own custom conversion table to compensate for the value displayed by instrument.

<How to calculate the Conversion Factor>

For a cleaner solution typically used at 5% concentration:

1. Mix 95ml of water and 5ml of undiluted cleaner solution. The concentration of this mixture solution will be 5%.
2. Measure this mixture. Assume the displayed value on the instrument is 4.00. Convert the displayed value to determine the conversion factor using the formula: [Conversion Factor = Actual concentration ÷ Displayed value] e.g. 5.00 ÷ 4.00 = 1.25
3. Once the conversion factor is known (1.25 for this example), measuring solutions with unknown concentration is simple.
   Assume the displayed value is 3.00 for a solution with an unknown concentration.

Using the simple formula [Concentration = Displayed value × Conversion Factor] (3.00 × 1.25), the actual concentration of the sample can be determined. E.g. 3.75

Automatic Temperature Compensation

The readings are corrected, based on the temperature of the prism, within the automatic temperature compensation range.
【Caution】 Measurements may fluctuate with hot or cold samples. Wait for approximately 20 seconds to press the START button.
Measurements will stabilize once the instrument acclimates to the sample temperature.

Storage and Maintenance

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.

Clean and dry the sample stage thoroughly, following the “Cleaning” instructions.
Store the unit away from direct sunlight at a stable temperature with as little fluctuation as possible.

Repair and 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 included batteries as well if they are still in use.

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

Repair services are available for a fee after the warranty expires. Contact an ATAGO authorized service center for service and support.

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

Specifications

Measurement range	0.00 to 25.00% 10.0 to 100℃
Resolution	0.01% / 0.1℃
Accuracy	±0.10% / ±1℃
Automatic temperature compensation range	10 to 100℃
Ambient temperature range	10 to 40℃

Sample volume	At least 0.3ml
Measurement time	Approx. 5 seconds 120 seconds of continuous measurement
Backlight	The backlight stays on for 30 seconds after any button is pressed.
Power supply	Two (2) AAA alkaline batteries
International Protection class	IP65
Dimensions and weight	55 (W) x 31 (D) x 109 (H)mm, 100g (main unit only)

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