

Atago PAL-2

Atago PAL-2 Digital Hand-Held Pocket Refractometer User Manual

Model: PAL-2 (R3000-2)

1. INTRODUCTION

The Atago PAL-2 is a high-range digital hand-held pocket refractometer designed for precise measurement of Brix (sugar concentration) in various high-concentration samples. This device is suitable for applications in the food and beverage, pharmaceutical, and chemical industries, among others. Its compact and ergonomic design allows for easy one-handed operation and portability.

Key features include Automatic Temperature Compensation (ATC) for accurate readings across a temperature range, an External Light Interference (ELI) warning, and an IP-65 rating for protection against dust and water jets, allowing for easy cleaning.



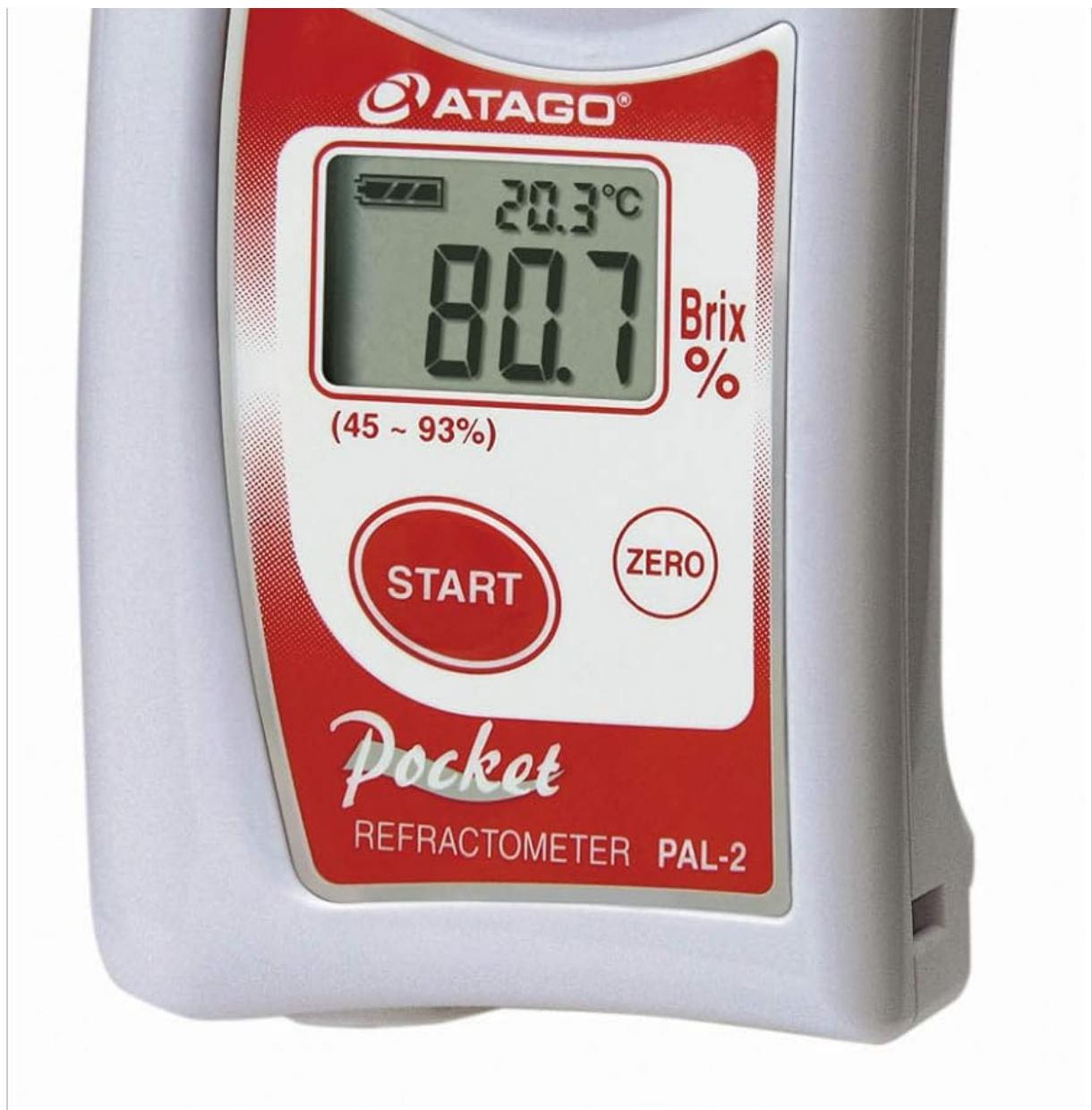


Figure 1: The Atago PAL-2 Digital Hand-Held Pocket Refractometer. This image displays the device with its digital screen showing a Brix reading of 80.7% and a temperature of 20.3°C. The sample prism is visible at the top, and the 'START' and 'ZERO' buttons are below the screen.

2. PACKAGE CONTENTS

Verify that all items listed below are present in the package:

- Atago PAL-2 Refractometer
- AAA Alkaline Batteries (x2)
- Plastic Storage Case
- Instruction Manual (this document)



Figure 2: The Atago PAL-2 Refractometer shown alongside a black lanyard. This image illustrates the compact size of the device and suggests its portability with the included accessory.

3. SETUP

3.1. Battery Installation

1. Locate the battery compartment cover on the back of the unit.
2. Open the cover and insert two (2) AAA alkaline batteries, ensuring correct polarity (+/-).
3. Close the battery compartment cover securely.

3.2. Initial Power On

Press the **START** button to power on the device. The LCD will display the current temperature and battery level.

4. OPERATING INSTRUCTIONS

4.1. Calibration (Zero Setting)

For accurate measurements, calibrate the refractometer with water before use, especially if the ambient temperature has changed significantly.

1. Ensure the prism surface is clean and dry.
2. Apply a few drops of clean tap water or distilled water onto the prism surface, ensuring it covers the entire surface without air bubbles.
3. Close the daylight plate gently.
4. Press the **ZERO** button. The display will show "0.0%" or "CAL" briefly, then return to 0.0% Brix. This indicates successful calibration.
5. Clean the prism surface thoroughly with a soft cloth or tissue.

4.2. Taking a Measurement

1. Ensure the prism surface is clean and dry.
2. Apply a few drops (approximately 0.3 mL) of the sample liquid onto the prism surface. Ensure the sample covers the entire surface.

- 3. Close the daylight plate gently.
- 4. Press the **START** button. The measurement will be displayed in approximately 3 seconds.
- 5. Read the Brix value and temperature from the LCD.
- 6. After measurement, clean the prism surface immediately with a soft, damp cloth or tissue, then dry it.

4.3. Automatic Temperature Compensation (ATC)

The PAL-2 features ATC, which automatically adjusts the Brix reading to a standard reference temperature (typically 20°C) based on the sample's measured temperature. This ensures accurate readings even if the sample temperature fluctuates between 10°C and 100°C.

4.4. External Light Interference (ELI) Warning

If direct light interferes with the measurement, the device will display a warning message. To resolve this, move the refractometer to a location with less direct light or shield the prism from strong light sources during measurement.

5. MAINTENANCE AND CARE

5.1. Cleaning the Prism

Always clean the prism surface immediately after each use. Use a soft, damp cloth or tissue to wipe off the sample. For sticky or viscous samples, a small amount of warm water can be used. The IP-65 rating allows the unit to be washed under running water, but avoid submerging the entire device.

5.2. General Cleaning

Wipe the body of the refractometer with a soft, dry cloth. Do not use abrasive cleaners or solvents, as these may damage the casing or display.

5.3. Storage

Store the refractometer in its plastic storage case in a cool, dry place, away from direct sunlight and extreme temperatures. Remove batteries if the device will not be used for an extended period to prevent leakage.

6. TROUBLESHOOTING

Problem	Possible Cause	Solution
No display when powered on	Dead or incorrectly installed batteries	Replace batteries with new AAA alkaline batteries, ensuring correct polarity.
Inaccurate readings	• Prism not clean • Improper calibration • Sample not covering prism • ELI warning ignored	• Clean prism thoroughly. • Recalibrate with clean water. • Ensure sufficient sample volume. • Move to a location with less direct light.
"ELI" warning displayed	External light interference	Move the device away from direct light sources or shield the prism during measurement.

Problem	Possible Cause	Solution
Slow measurement response	Sample temperature outside ATC range or extreme ambient temperature	Allow sample to reach a temperature within the 10°C to 100°C range. Ensure ambient temperature is between 10°C and 40°C.

7. SPECIFICATIONS

Parameter	Value
Model Number	PAL-2 (R3000-2)
Measurement Scale Range (Brix)	45.0 to 93.0%
Measurement Scale Range (Temperature)	9.0 to 99.9 °C
Measurement Resolution (Brix)	0.1%
Measurement Resolution (Temperature)	0.1 °C
Measurement Accuracy (Brix)	± 0.2%
Measurement Accuracy (Temperature)	± 1 °C
Sample Measurement Temperature (ATC)	10 to 100 °C
Ambient Temperature	10 to 40 °C
Sample Volume	0.3 mL
Measurement Time	3 seconds
Ingress Protection (IP) Rating	IP-65 (Dust tight, protected against water jets)
Display	Digital LCD
Power Supply	(2) AAA Alkaline Batteries
Dimensions (H x W x D)	10.9 x 5.5 x 3.1 cm
Weight	100 g

8. SAFETY INFORMATION

- Do not drop or subject the device to strong impacts.
- Avoid exposing the device to extreme temperatures or direct sunlight for prolonged periods.
- Do not attempt to disassemble or modify the refractometer, as this will void the warranty and may cause damage.
- Keep the device out of reach of children.
- Dispose of batteries according to local regulations.

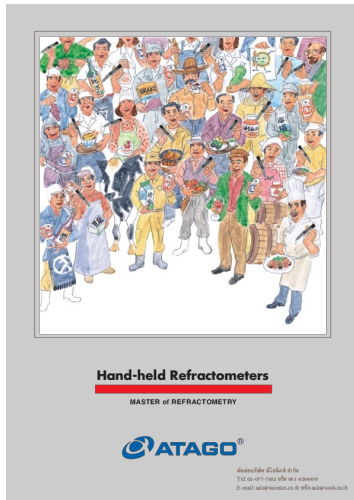
9. WARRANTY AND SUPPORT

Atago products are manufactured to high quality standards. For warranty information, technical support, or service, please contact Atago Co., Ltd. directly or your authorized Atago distributor. Refer to the official Atago website for contact details and the most current warranty policy.

Atago Co., Ltd. is committed to providing reliable analytical instruments that comply with international standards such as HACCP, GMP, GLP, and various ISO standards.

Related Documents - PAL-2

	ATAGO PAL-1 Digital Hand-held Pocket Refractometer Instruction Manual This instruction manual provides detailed guidance on operating the ATAGO PAL-1 digital hand-held pocket refractometer. It covers safety precautions, battery insertion, zero setting, measurement procedures, error messages, maintenance, specifications, and warranty information for accurate Brix measurements.
	ATAGO PAL-1 Pocket Refractometer User Manual This manual provides instructions for the ATAGO PAL-1 Pocket Refractometer, covering safety precautions, operation, maintenance, and specifications for accurate Brix measurements.
	ATAGO PAL-1 Digital Hand-held Refractometer Instruction Manual Instruction manual for the ATAGO PAL-1 Digital Hand-held Refractometer, covering its features, operation, maintenance, and specifications. Includes guidance on zero-setting, measurement, cleaning, and battery replacement.
	ATAGO PAL-34S Digital Hand-held Ethyl Alcohol Refractometer Manual User manual for the ATAGO PAL-34S digital hand-held ethyl alcohol refractometer, covering operation, maintenance, specifications, and warranty.
	ATAGO MASTER-T Series Refractometer: User Manual and Specifications Comprehensive guide to the ATAGO MASTER-T Series refractometers, covering quick sampling, Brix scale, maintenance, specifications, and calibration for accurate measurements.
	ATAGO PAL-SALT Pocket Salt Meter Instruction Manual Comprehensive instruction manual for the ATAGO PAL-SALT digital hand-held pocket salt meter (Cat.No.4250), covering operation, calibration, maintenance, safety, and specifications.



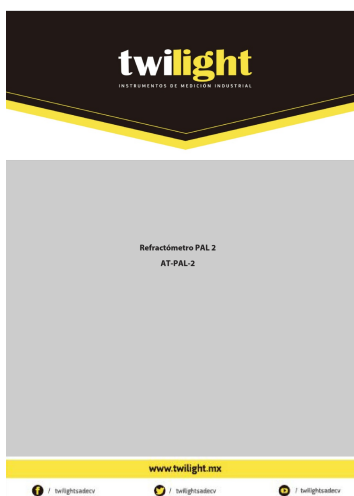
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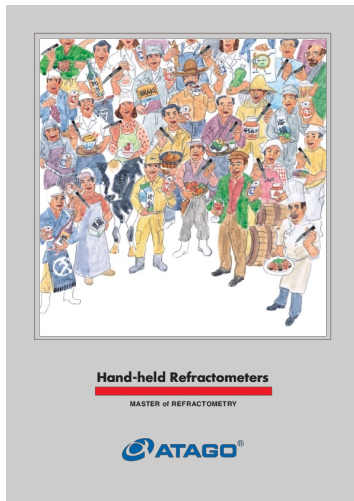


[pdf] Warranty Catalog

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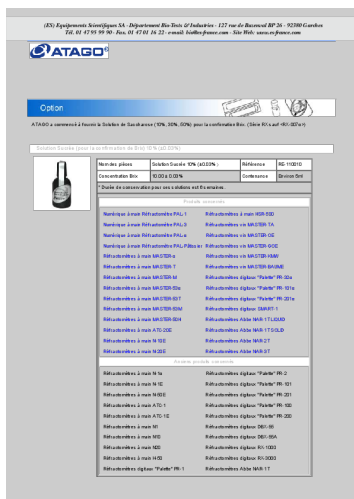
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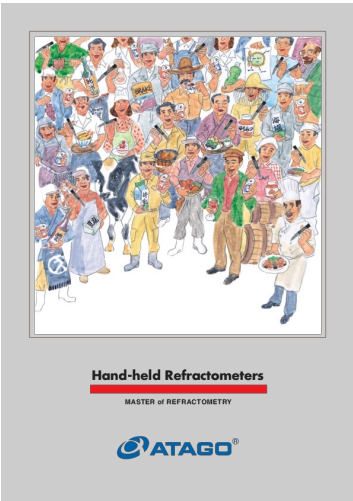


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These are also known for features like reliable performance, compact design and longer service life.

Category	Products
Hand Refractometer: Atago Japan	• Hand Held Refractometer: Model 314 range 0-33% Atago , Japan • Hand Held Refractometer: Model 214 range 28-62% Atago , Japan • Hand Held Refractometer: Model 305 range 58-90% Atago , Japan
Master T Series (Auto Temperature Compensation)	• Hand Held Refractometer: Model T range 0-33% Atago , Japan • Hand Held Refractometer: Model 2T range 28-62% Atago , Japan • Hand Held Refractometer: Model 3T range 58-90% Atago , Japan
Master H Series (Water Resistant, ATC, Heat Resistant)	• Refractometer designed for high temp samples during cooking or boiling • Range Max 0.53% , 45-92% , 0.10% , 0-20% are available in both the models.Please en Request • Model - 101, Range 0-30% • Model - 101, Range 30-30% • Model - 101, Range 45-92% • Model - 101, Range 60-100%
Sucrose Solutions - Standards for Refractometer	• Refractometer solution 10% to 30% or 30% of sugar
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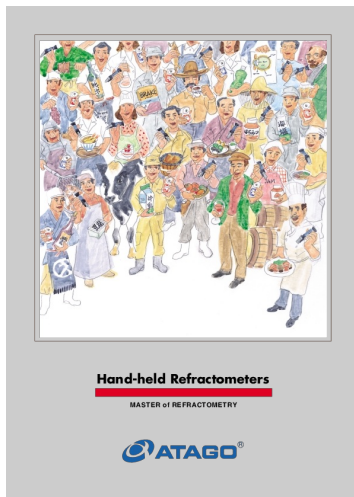


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