



# The Next Generation of Digital Refractometers

# "Pocket" Refractometers PAL series



- Extremely water resistant (IP65)
- Can be washed under running water
- Will float if accidentally dropped in water



- Ergonomically designed for one-handed operation
- The innovative design makes it easy to pour out and remove a sample, but difficult to spill the sample.



- Automatic Temperature Compensation (ATC)



- Temperature display



- Measurement temperature up to 100°C



- Revolutionary new External Light interference (ELI) feature (Patented)
- When intense light penetrates the prism of a digital refractometer, the light waves interfere with the sensor, which may lead to inaccurate measurements. To ensure accurate measurement results, the PAL is programmed with the ELI function which displays the [nnn] warning message when intense direct light is detected. Forming a habit of shading the sample stage with your hand and re-pressing the START key (when the warning message from the ELI function is displayed) will ensure accurate measurement results each time.



- Mode S: Mode S improves repeatability of samples that cause inconsistent readings.



Low to medium

**PAL-1**  
Cat.No.3810

High concentration

**PAL-2**  
Cat.No.3820

Wide range

**PAL-3**  
Cat.No.3830

Powered by Mode S

**PAL-S**  
Cat.No.3860

Honey moisture %

**PAL-22S**  
Cat.No.4422

Hydrogen peroxide (w/w)

**PAL-39S**  
Cat.No.4439

Standard accessory  
MAGIC™

## Optional

Part No.	Part Name.
RE-110010	Sucrose Solutions (for Brix confirmation)10% (±0.03%)
RE-110020	Sucrose Solutions (for Brix confirmation)20% (±0.03%)
RE-110030	Sucrose Solutions (for Brix confirmation)30% (±0.03%)
RE-110040	Sucrose Solutions (for Brix confirmation)40% (±0.04%)
RE-110050	Sucrose Solutions (for Brix confirmation)50% (±0.05%)
RE-110060	Sucrose Solutions (for Brix confirmation)60% (±0.05%)
RE-39409	PAL-CASE
RE-39410	PAL-STRAP
RE-39446	MAGIC™
RE-39412	Small Volume Sample Adapter for PAL
RE-39413	PAL Silicone Cover



◀ **Sucrose Solutions**  
Custom concentrations are available upon request. Accuracy and prices will vary by concentration. Contact ATAGO for more details.

\* Warranty period for these solutions is 6 weeks.



◀ **MAGIC™**  
This adaptor is used for a hot sample to cool it down quickly or to minimize evaporation.



◀ **Small Volume Sample Adapter for PAL**  
Allows for measurements with a small volume of sample. Place directly on the sample stage.

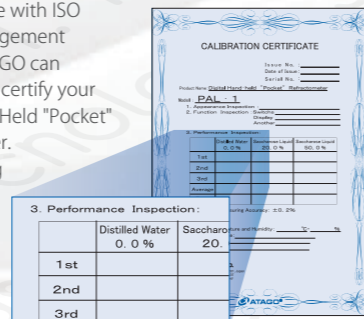


▲ PAL Silicone Cover    ▲ PAL-CASE    ▲ PAL-STRAP

## Certification

In accordance with ISO Quality Management Systems, ATAGO can calibrate and certify your Digital Hand-Held "Pocket" Refractometer. The following documents will be issued (for a service fee):

- Calibration Certificate
- Traceability System Diagram
- Traceability Certificate



## PAL commitment

### A new ergonomic design for comfort and ease of use!

In pursuit of an "easy to use", "easy to operate" and ergonomic architecture of new instruments, ATAGO has achieved a "palm-fitting" masterpiece as well as unit that is high in hygienic properties. By reducing the number of unnecessary assembly parts, we have reduced the risks of a germ reproductive environment. Through our efforts to produce a hygienic instrument to be used in any industry, these units are designed to be completely washable. The new PAL series has been approved by the HACCP, and are equipped with the new ELI feature, which ensures accurate measurements - even outdoors. Requests from our customers worldwide are reflected in the development of the new PAL units.

### Sample Stage

The SUS sample stage allows for the sample temperature to conform quickly and evenly to the prism temperature for accurate measurements.

### START Key

Conveniently located for single hand operation.



Calibration Report



Convenient storage case

Actual Size



### Prism

Made of highly durable optical glass to prevent scratching.

### Liquid Crystal Display (LCD)

Digital measurement values are large and easy to read. Displays battery indicator and temperature.

### ZERO Key

For Zero Setting, place water on the prism and press.

### Strap Holder

Suitable for wrist straps or lanyards.

## Measurement Method



1 Apply 2-3 drops on the prism surface.



2 Press the START key.



3 Measurement value and prism temperature are displayed in 3 seconds!

## Application examples



## Specifications

	PAL-1 Cat.No.3810	PAL-2 Cat.No.3820	PAL-3 Cat.No.3830	PAL-S Cat.No.3860	PAL-22S Cat.No.4422	PAL-39S Cat.No.4439
Measurement range	Brix 0.0 to 53.0%	Brix 45.0 to 93.0%	Brix 0.0 to 93.0%	Brix 0.0 to 93.0%	Honey moisture 12.0 to 30.0 %	Hydrogen peroxide 0.0 to 50.0%
Measurement Accuracy	Brix ±0.2%	Brix ±0.1%	Brix ±0.1%	Brix ±0.2%	Honey moisture ±0.2 %	Hydrogen peroxide ±0.6%
Resolution	Brix 0.1%			Honey moisture 0.1 % Hydrogen peroxide 0.2%		
Measurement temperature	10 to 100°C (ATC) (Hot samples over 100° C can be measured under specified conditions. Please contact ATAGO for further details.)					
Ambient temperature	10 to 40°C					
Power supply	2×AAA Batteries					
International protection class	IP65 Water resistant					
Dimensions and weight	5.5×3.1×10.9cm, 100g					

**Easy to Use**

**High Performance**

**Digital Display**

The Digital Hand-Held "Pocket" Refractometer PAL-RI, can easily measure samples and display readings digitally. And temperature of the measurement will be displayed continuously.

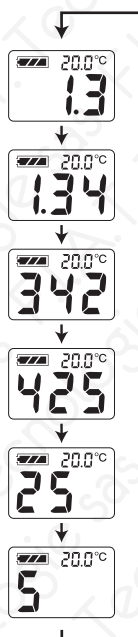
## Digital Hand-held "Pocket" Refractometer

Cat.No.3850

# PAL-RI

### Example of display

i.e.) display of the measurement values "1.3425" and "20.0°C".



The numeric characters will stream from right to left on the display in intervals of 0.8 seconds.

**Quick & Easy cleanup!**



Actual size

## Features

- Requires only a few drops of sample
- Measurement in 3 seconds
- Ergonomically designed for easy, one-handed operation
- Light & Compact, 100g
- Designed with a strap holder option
- Highly water resistant (IP65)
- Convenient storage case
- Battery power indicator

## Specifications

Measurement range	: Refractive index 1.3306 to 1.5284
	: Temperature 5.0 to 45.0°C
Resolution	: Refractive index 0.0001, Temperature 0.1°C
Measurement accuracy	: Refractive index ±0.0003 (water at 20°C)
	: Temperature ±1°C
Measurement temperature	: 5 to 45°C
Ambient temperature	: 10 to 40°C
Power supply	: AAA alkaline battery × 2
Battery life	: Approx. 11,000 measurements
International Protection Class	: IP65 Water resistant
Dimensions and weight	: 55(W) × 31(D) × 109(H)mm, 100g (Main Unit only)

\*The displayed refractive index is not the temperature compensated value. It is the refractive index for the displayed measurement temperature.

All ATAGO refractometers are designed and manufactured in Japan.

**HACCP GMP GLP**

ATAGO products comply with HACCP, GMP, and GLP system standards.

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\* Specifications and appearance are subject to change without notice.

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# DIGITAL HAND-HELD "POCKET" REFRACTOMETER

65th anniversary

# PAL-α

Cat.No.3840

Special Anniversary model  
with a wide Brix range **0 to 85%!!**



Actual Size

## Measurement Method



Apply 2-3 drops onto the prism surface.



Press the START key.



The measurement value will be displayed in 3 seconds.

## Application

- \* Outdoors in the vegetable fields and fruit orchards
- \* Indoors for beverages (fruits juice, coffee, soft drink, etc) and foods (soy sauce, sauce, seasoning, soup, jam, marmalade, maple syrup, etc.)
- \* At fruit and vegetable packing facilities and in the supermarket
- \* At restaurants or shops
- \* At junior high schools, high schools, or universities as course material

## Features

- \* Calibration with water only
- \* Measurement in 3 seconds
- \* Extremely water resistant (IP65)
- \* Light & Compact, 100g
- \* Ergonomically designed for easy, one-handed operation
- \* Convenient storage case
- \* Automatic Temperature Compensation (ATC)
- \* Designed with a strap holder option



## Specifications

Measurement range	: Brix 0.0 to 85.0%
Resolution	: Brix 0.1%
Measurement accuracy	: Brix ±0.2%
Repeatability	: Brix ±0.1%
Ambient Temperature	: 10 to 40°C
Measurement Temperature	: 10 to 75°C (Automatic Temperature Compensation)
Sample volume	: 0.3ml or more
Measurement time	: 3 seconds
Power supply	: AAA alkaline battery × 2
Battery life	: Approx. 11,000 measurements (Using new alkaline batteries)
International Protection Class	: IP65 Water resistant
Dimensions and weight	: 55(W)×31(D)×109(H)mm, 100g

All ATAGO refractometers are designed and manufactured in Japan.

**HACCP GMP GLP** ATAGO products comply with HACCP, GMP, and GLP system standards.

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