

twilight

INSTRUMENTOS DE MEDICIÓN INDUSTRIAL

Refractometro Tipo Lapiz

AT-PenPro

www.twilight.mx

 / [twilightsadecv](#)

 / [twilightsadecv](#)

 / [twilightsadecv](#)

Pen Refractometer PEN-PRO

Cat.No.3730

ATAGO®
Instruction Manual

Do not dip the instrument in any sample that is over 100°C.

3730-E08

Introduction

Thank you for purchasing the Digital Hand-Held "PEN" Refractometer, PEN-PRO. Before operating, read this instruction manual carefully to understand its contents. Keep the manual with the instrument for future reference.

Safety Precautions

To use the PEN-PRO safely, the precautions described in this instruction manual must be observed. Failure to comply may result in injury and/or damage to property.

WARNING

Use caution as hot samples can cause severe burns. Do not dip the instrument directly into a boiling pot to measure; instead, place the liquid in a separate container and measure.

- When measuring hazardous materials, use proper safety procedures, materials, and clothing to avoid personal injury. Anyone handling hazardous materials should understand their properties and safety requirements.
- If the instrument is dropped or subjected to a strong impact, contact your supplier for inspection.
- Do not attempt to repair, modify, or disassemble the instrument.

CAUTION

- Do not dip the instrument in any sample that is over 100°C.
- If this instrument is used to measure highly acidic samples, the prism and prism head may be damaged, resulting in inaccurate measurements.
- The prism is made of optical glass. Metal tools and/or implements can damage the prism surface. If the surface of the prism is scratched or damaged, inaccurate measurements will occur.
- Before use, carefully read the instruction manual and fully understand the function and operation of the instrument.
- Use the battery specified for this refractometer. Insert the battery properly, paying attention to the polarities.
- Do not leave the instrument in a location exposed to direct sunlight or near a heat source for any extended period of time.
- Do not change the ambient temperature of the instrument suddenly.
- Do not place the instrument where it will be subject to strong vibrations.
- Do not use the instrument where there is an excessive amount of dust.
- Do not store the instrument in an extremely cool area.
- Do not set or drop heavy objects on the instrument.
- When transporting the PEN-PRO on an airplane, remove the battery.

<Note regarding water resistance>

Only the prism head of the PEN-PRO should be submerged into water.

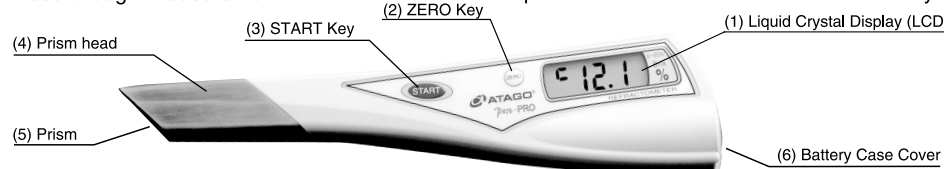
1. Contents

The PEN-PRO comes with the following items:

- Pen Refractometer PEN-PRO1
- Size AAA Battery1
- Instruction Manual (this book)1
- Storage Box1

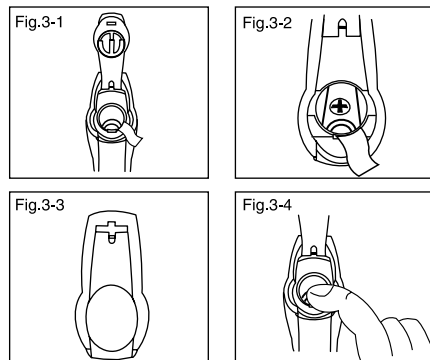
2. Parts

- Liquid Crystal Display (LCD)
Displays the measured values.
- ZERO Key
Press to perform zero-setting.
- START Key
Press to begin measurement.
- Prism head
The prism housing area that is dipped into samples.
- Prism
- Battery Case Cover
Open the lid to insert and take out the battery.



3. How to insert (or replace) the battery

- Open the battery case cover (Fig. 3-1).
 - One AAA battery and a protective strip of tape are included with the instrument at purchase. Remove the protective tape from the underside of the battery case cover before use (Fig. 3-2).
 - Close the battery case cover. A click will indicate the cover is securely closed (Fig. 3-3).
 - To change the battery, open the battery case cover and depress the edge of the battery with your finger to remove (Fig. 3-4).
 - Insert a new AAA alkaline battery with the negative (-) terminal end in first.
- When the battery power is low, as displayed by [Lo] message, replace with a new alkaline AAA battery.
 - Always check the expiration date when purchasing and inserting new batteries.
 - Perform Zero Setting after replacing the battery.

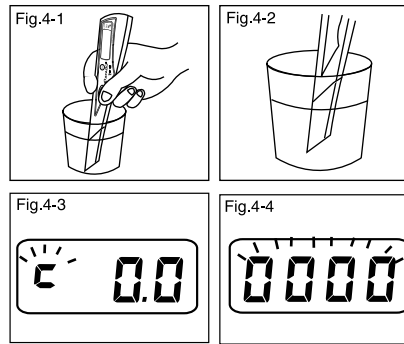


4. Zero Setting

CAUTION

- Perform Zero Setting each day prior to using the PEN-PRO.
- Use distilled or tap water that is approximately the same temperature of the sample to be measured. Zero-set the unit with 60°C water before measuring hot samples.
- If the ELI* function displays the [nnnn] warning message while performing zero-setting, shade the prism head with your hand and press the ZERO key again.
- If the LCD screen displays [AAAA], dip the prism head in water again and press the ZERO key, ensuring the prism is not exposed to air.

- Wipe the prism and the prism head clean.
- Prepare distilled or tap water in a clean container.
- Fully submerge the prism head into the water and press the START key OR press the START key and (within 10 seconds) fully submerge the prism head into the water (Fig. 4-1) (Fig. 4-2).
- The Brix (%) will be displayed in approximately 2 seconds. There is no need to zero set if the unit displays 0.0. "c" will blink every second when a measurement is taken (Fig. 4-3). After wiping the water off of the prism and prism head completely, dip or touch the prism onto the sample. The PEN-PRO will continue measuring and displaying the result as long as the prism is in contact with the sample.



*If the [LLLL] message is displayed, ensure the prism is submerged in the sample and press the START key again (see section 6. Error Messages).

- If the Brix displayed is not 0.0, keep the prism head submerged in the water and hold down the "ZERO" key until [0000] starts to blink. [0000] will blink twice (Fig. 4-4). And the screen will return to the measurement screen (Fig. 4-3). After wiping the water off of the prism and prism head, dip or touch the prism onto the sample. The PEN-PRO will continue measuring and displaying the results as long as the prism is in contact with the sample.

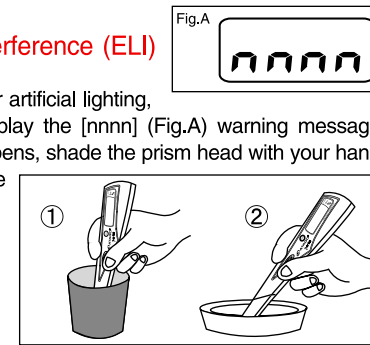
*If an error occurs during zero setting, the screen will blink "0000" twice, then [AAAA] once (see section 6. Error Messages). Then the display will return to the measurement screen (Fig. 4-3).

ELI Function

<The PEN-PRO is equipped with the External Light Interference (ELI) function to ensure accurate readings>

If the PEN-PRO is subjected to intense light, such as direct sunlight or artificial lighting, when measuring a sample or zero setting, the ELI function will display the [nnnn] (Fig.A) warning message immediately after the START or ZERO key is pressed. When this happens, shade the prism head with your hand and press the START or ZERO key again. If the warning message continues to be displayed, try the following methods:

- Place the sample in a non-translucent cup to measure.
- Using a shallow container, keep the prism close to the bottom of the container while taking measurements.



*External Light Interference (ELI)

5. Measuring Method

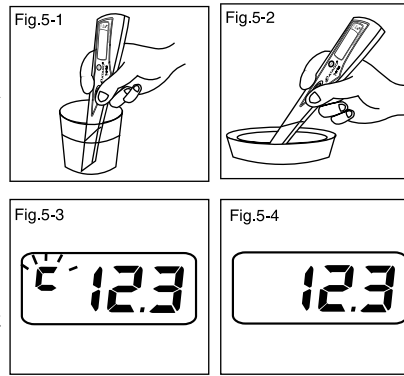
CAUTION

- Do not dip the instrument in any sample that is over 100°C.
- Readings taken with an acclimated prism stabilize more quickly; when measuring high temperature samples, dip the prism head into 60°C water and allow it to acclimate to the temperature change.
- If the ELI* function indicates the [nnnn] warning message on the LCD screen while measuring a sample, shade the prism head with your hand and press the START key again.

Two different ways to measure a sample:

- Dip the prism head into a sample-filled container (Fig. 5-1).
- For small sample volumes, touch the prism head into the sample (Fig. 5-2).

- Dip the prism head into the sample and press the START key OR press the START key and (within 10 seconds) touch the prism head into the sample.
- The Brix (%) will be displayed in approximately 2 seconds (Fig. 5-3). Thereafter, the display will update every second showing the measured value as the instrument takes continuous measurements.
- The unit will turn itself off after 3 minutes of continuous measurement. The results displayed will start blinking approximately 10 seconds before the screen is turned off. If a longer measurement time is desired, hold down the START key for 1 second to resume continuous measurement.

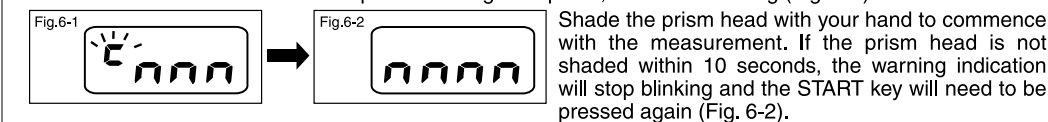


*Press the START key to pause measurement. The last measured value will be displayed (Fig. 5-4). The unit will automatically turn off after 2 minutes in this paused state. Press the START key again to resume measurement. *When the temperature of a sample is above or below the room temperature (but within 10-100°C), measurements should continue to be taken until the measurement results stabilize, even after the temperature error message [ttt] turns off (see section 6. Error Messages). *If the sample has inconsistent layers or contains undissolved solids, stir until well mixed or dissolved before taking a measurement.

6. Error Messages

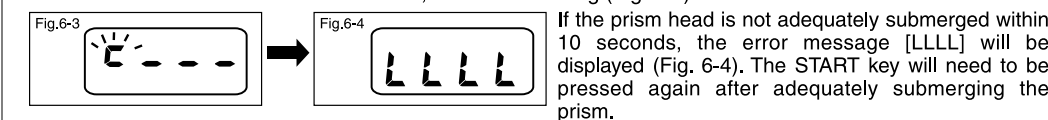
Improper operation of the PEN-PRO will result in one of the following error messages:

◎External Light Interference (ELI) : The following warning message will be displayed when intense light passes through the prism, and "c" is blinking (Fig. 6-1).



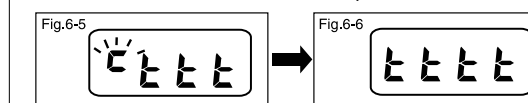
*If the START key is pressed while "c" is blinking, "nnn" will appear.

◎Air Measurement Error : The following error will be displayed when the prism is exposed to air during a measurement, and "c" is blinking (Fig. 6-3).



*If the START key is pressed while "c" is blinking, "LLL" will appear.

◎Temperature Error : The following error message will be displayed when the temperature of the prism and the temperature of the sample vary greatly.



Leave the prism head submerged into or touched to the sample while "c" is blinking (Fig. 6-5). Once the sample temperature and prism temperature equalize, measurement will begin.

If the temperature difference remains too wide after 30 seconds, the error message will stop blinking (Fig. 6-6). Keep the prism head submerged in the sample and press the START key again.

*If the START key is pressed while "c" is blinking, "ttt" will appear.

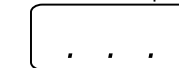
Other Errors

• Zero Setting Error



The following error message will be displayed when the ZERO key is pressed while the prism head is exposed to air, or is submerged in a solution other than water.

• Out of Temperature Correction Range Error



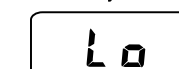
The following error message will be displayed when measurement is conducted outside the temperature correction range of 10 to 100°C.

• Out of Range Error



The sample's measured value is out of the measurement range.

• Battery Error



The following error message will be displayed when the battery power is low, replace with a new alkaline AAA battery.

• Malfunctioning Error



With the instrument turned off, remove and reinsert the battery. In the case of a low battery, replace the battery with a new alkaline AAA battery. If the instrument continues to display the error message, the instrument will need to be repaired. Please contact your Authorized ATAGO Distributor for information on repair.

7. How to Turn the Power Off

The PEN-PRO will power off automatically after 2 minutes of non-use. To manually turn off the power off, press and hold the START key for 4 seconds.

8. Storage and Maintenance

- Store this instrument in a dry and shaded area. A damp storage area may cause the optical system to malfunction or facilitate the growth of mold. Extended exposure to direct sunlight may cause the casing to warp.
- Do not use organic solvents (paint thinner, benzene, gasoline, etc.) on the instrument as they will severely damage the casing.
- Clean the prism surface immediately after completing each measurement. Sample left on the prism surface for an extended period of time will damage the prism. Clean the prism with water and dry any excess moisture with a clean, dry tissue.

9. Brix Scale and Automatic Temperature Compensation

(1) Brix Scale

All Refractometers are designed to measure the Refractive Index of a solution. The Brix scale is based on a sucrose (sugar) and water solution. However, since most samples contain substances other than sugar - such as salts, minerals and proteins - the Brix percentage represents the total concentration of all soluble solids in the sample. For certain samples, such as cutting oils and other industrial fluids, a conversion chart from the Brix percentage to the sample's total concentration may be necessary.

(2) Automatic Temperature Compensation (ATC)

The ATC feature of the PEN-PRO displays the measured value of the sample at the standard 20°C (within the measurement temperature range of 10 to 100°C). As the temperature of a solution changes, so does the Refractive Index. The ATC feature of the PEN-PRO is performed by a temperature sensor which measures the change in prism temperature and then calculates the actual measured value in relation to the temperature change. Since the prism temperature is changing, allow time for the temperature of the prism and sample to equalize for the ATC to work properly.

10. Specifications

Measurement modes	Continuous
Measurement range	Brix 0.0 to 85.0% (Automatic Temperature Compensation)
Resolution	Brix 0.1%
Measurement accuracy	Brix ±0.2% (10 to 60°C)
Measurement temperature	10 to 100°C (Automatic Temperature Compensation)
Liquid sample temperature	10 to 100°C
Ambient temperature	10 to 40°C
Measuring time	2 seconds
Power supply	Size AAA alkaline battery × 1
Battery life	About 8,000 times measurement (when an alkaline battery is used)
International Protection class	IP65 Water Resistant (Prism head: IP67)
Dimensions and weight	160(W) × 38(D) × 18(H)mm, 70g

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

12. CE Certification

The product is in conformity with the requirements of the EMC Directive 2004/108/EC.

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

World-wide patent and registration pending.

ATAGO CO.,LTD.

Headquarters: The Front Tower Shiba Koen, 23rd Floor
2-6-3 Shiba-koen, Minato-ku, Tokyo 105-0011, Japan
TEL: 81-3-3431-1943 overseas@atago.net http://www.atago.net/

ATAGO U.S.A., Inc.

TEL: 1-425-637-2107 customerservice@atago-usa.com

ATAGO INDIA Instruments Pvt. Ltd.

TEL: 91-22-28544915 / 40713232
customerservice@atago-india.com

ATAGO THAILAND Co.,Ltd.

TEL: 66-21948727-9, 66-21171549
customerservice@atago-thailand.com

ATAGO BRASIL Ltda.

TEL: 55 16 3913-8400 customerservice@atago-brasil.com

ATAGO ITALIA s.r.l.

TEL: 39 02 36557267 customerservice@atago-italia.com

ATAGO CHINA Guangzhou Co.,Ltd.

TEL: 86-20-38108256 info@atago-china.com

ATAGO RUSSIA Ltd.

TEL: 7-812-777-96-96 info@atago-russia.com

11. 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 Prism head
- 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.

twilight

INSTRUMENTOS DE MEDICIÓN INDUSTRIAL



LLÁMANOS

+52(81) 8115-1400 / +52 (81) 8173-4300

LADA Sin Costo:
01 800 087 43 75

E-mail:
ventas@twilight.mx

www.twilight.mx