twilight

INSTRUMENTOS DE MEDICIÓN INDUSTRIAL

# Refractometro y Acidez para Cereza de Café

AT-PALBX_ACID40KIT

7140-E03

# Pocket Brix-Acidity Meter (Coffee cherry)
Master Kit

ATAGO®
Instruction Manual

# PAL-BX|ACID40

Cat. No. 7140

## Parts

GOOD DESIGN

**LCD**
Displays the measured values, sensor temperature, and battery indicator.
The instrument will turn itself off after 2 minutes of inactivity.
To manually turn it off, hold down the START button for more than 2 seconds.

**START Button**
Press to take measurement.
To turn off the display, press and hold for more than 2 seconds.

**R Button**
Press the button to show the sugar and acidity ratio.

**Battery Compartment**
Place and remove batteries from here.

**Sample Stage**
Place sample on the sensor located at the center of the sample stage.

**ZERO Button**
Press to perform zero-setting.

**Lanyard Hole**

## Contents

Main unit…1 Instruction Manual (this book)…1 AAA batteries…2 Measuring Spoon 1mL…1
Beaker 100mL…1 Digital scale…1 (☞About the Digital Scale)

Note Please remove the tape in the battery compartment before first use.
Memo The measuring spoon is available from ATAGO.
Part No. RE-39005 Measuring Spoon 1mL

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

## Quick Tips

- The instrument measures the Brix in the sample solution, and the acidity in the 1: 50 dilution of the sample that is diluted with purified water.
- Press the START button once to measure the Brix.
  The Brix and the acidity of the sample (stock-solution) will be displayed at the end of the measurement.

Measurement of Brix ▶ Measurement of Acid


- Press the ZERO button to perform zero-setting for either Brix or Acidity.
  Zero-setting can be performed with water (for Brix) or air (for acidity)

- LCD Auto Shut-off
  The instrument will turn itself off after 2 minutes of inactivity. To manually turn it off, hold down the START button for more than 2 seconds.

## Zero-setting and Measurement

### Preparation

Note Recommended on a daily basis.

Acid: Zero-setting

1. Clean the sensor with water. Dry the area with tissues thoroughly.
2. Press the START button (with nothing on the sensor). ↓ START
   "LLL" will appear. (20.4℃ LLL Brix%)
3. Press the START button. ↓ START
4. **Measurement: not 0.00 Acid**
   —Zero-setting is required.—
   Press the ZERO button (with nothing on the sensor). ↓ ZERO
   "000" will appear. (Brix% 000 / Acid 000)
   Flash ▶ Light up
   **Measurement: 0.00 Acid**
   The instrument is zero-set correctly. (LLL / 000 Acid)
   Proceed to Brix: Zero-setting.

Brix: Zero-setting

1. Apply tap/purified water.



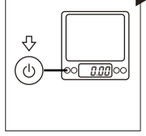

2. Press the START button. ↓ START
3. **Measurement: not 0.0 Brix**
   —Zero-setting is required.—
   Press the ZERO button. ↓ ZERO
   "000" will appear. (Brix% 000 / Acid 000)
   Flash ▶ Light up
   **Measurement: 0.0 Brix**
   The instrument is zero-set correctly. Press the START button. (0.0 Brix%)
   Proceed to measurement.

### Measurement

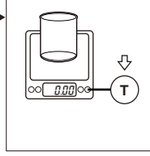
[1]Acid: Dilution ☞About the Digital Scale

Memo Necessary Materials
Digital scale, Beaker 100mL

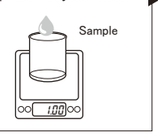
1. Press the POWER Button.




2. Place the beaker on the scale and zero set (tare). (Press the Zero-set button (tare))




3. Pour 1.00g of sample into the beaker.
   Memo Any amount of sample can be made as long as the dilution ration is 1:50. We recommend 1.00g of sample to keep accuracy consistent.




4. Add purified water until the total weight is 50.00g.


5. Gently stir.

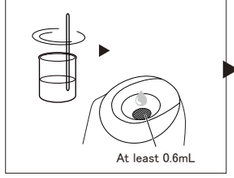
[2]Measuring the Brix

1. Clean the sensor with water. Dry the area with tissues thoroughly.
2. Apply some sample (undiluted).


3. Press the START button. ↓ START
   Measurement is displayed after "---." (20.4℃ 12.3 Brix%)
   Memo In case "LLL" is displayed, add sample and measure the Brix again. Remove sample.
4. Cleaning
   Clean the sensor with water. Dry the area with tissues thoroughly.

[3]Measuring the Acidity

5. Apply some diluted sample (as shown in [1]).




6. Press the START button. ↓ START
   Measurement is displayed after "---." The unit of Acid is %. (20.4℃ 12.3 Brix% 0.25 Acid)
   Memo The measurement is the value of the sample (stock-solution).
   Memo The displayed value is the temperature at the measurement of acidity.

Sugar/Acid Ratio Display
Press the R button when the Brix or Acidity is displayed to show the sugar and acidity ratio. Sugar/Acid ratio = Brix% / Acidity%
↓ R (20.4℃ 49.2)
Memo Press the R button to return to the measurement value display.

Cleaning

- Wipe off the sample. Clean the sensor with water. Dry the area with tissues thoroughly.
- Clean oily residues with mild soap, and then, rinse with water.

Note Handle the sensor with care so as not to scratch it.

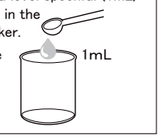
## Addendum

Acid: Measuring Without using a Scale
For approximate measurement only

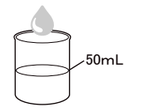
[1]Acid: Dilution

Memo Necessary Materials
Measuring spoon 1mL, Beaker 100mL

1. Using the attahced measuring spoon, place a level spoonful (1mL) of fruit juice in the attached beaker.



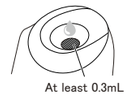

2. Add purified water to the beaker until the total amout is 50mL.




3. Gently stir.

[2]Measuring the Brix

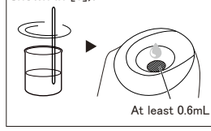
1. Clean the sensor with water. Dry the area with tissues thoroughly.
2. Apply some sample (undiluted).




3. Press the START button. ↓ START
   Measurement is displayed after "---." (20.4℃ 12.3 Brix%)
   Memo In case "LLL" is displayed, add sample and measure the Brix again. Remove sample.
4. Cleaning
   Clean the sensor with water. Dry the area with tissues thoroughly.

[3]Measuring the Acidity

5. Apply some diluted sample (as shown in [1]).




6. Press the START button. ↓ START
   Measurement is displayed after "---." The unit of Acid is %. (20.4℃ 12.3 Brix% 0.25 Acid)

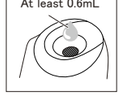
## Acid: Checking with Reference Solution

When there is any doubt regarding accuracy of measurement results, adjust the reference value according to the following procedure.

Memo The reference solution is available from ATAGO.
Part No. RE-130004 Reference solution (0.04% Citric acid solution)

Acid: Checking with Reference Solution

1. Clean the sensor with water. Dry the area with tissues thoroughly. (Press the START button to turn on the instrument.)
2. Press the ZERO button (with nothing on the sensor) to zero-set. ↓ ZERO
   "000" will appear. (20.4℃ 000 Acid)
   Flash ▶ Light up
3. Apply the reference solution. *Reference solution (0.04% (g/100g) Citric acid solution)




4. Press the START button 2 times ↓ START (20.4℃ 0.0 Brix%) ↓ START
   Memo Brix (%) may not be 0.0% (this will not affect accuracy of measurement values).
5. **Measurement: not 1.00 (±0.20) Acid**
   Calibration is required.
   **Measurement: 1.00 (±0.20) Acid**
   The instrument is calibrated correctly. (20.4℃ 0.0 Brix% 1.00 Acid)
   Memo Brix (%) may not be 0.0% (this will not affect accuracy of measurement values).

Acid: Calibration

6. Apply the reference solution. Turn on the instrument. Press the START and ZERO buttons simultaneously. ↓ START ↓ ZERO
   "CCC" will appear. (20.4℃ CCC Acid)
   Flash ▶ Light up

## Error Messages

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

**Lo**
- The battery is low.

**AAA** Brix
- The ZERO button was pressed with something other than water on the sensor section.

Acid
- The sensor was not empty when zero-setting was attempted.
- Calibration was attempted with something other than the calibration solution.

**LLL** Brix
- The START button was pressed with nothing or an insufficient amount of sample on the sensor section.

Temperature
- The sensor temperature is below the temperature range.

**HHH** Brix/Acid
- The sample measured outside the measurement range

Temperature
- The sensor temperature is above the temperature range.

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

**- - -** Sugar/Acid Ratio
- When the Sugar/Acid Ratio is unable to be calculated.

## Acid: Offset Function

### Discrepancies with titration

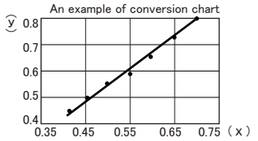
Due to the difference in measurement principles, readings from the instrument may not match up exactly with the readings by titration for certain samples.
However, correlation between the two testing methods can be seen.

### Offset feature use

Create a conversion chart between the two testing methods.

$$y = a x + b$$

y : titration readings
x : The instrument readings
a : coefficient (multiplication)
b : addition/subtraction number




For addition/subtraction (b) [Range: −5.00 to 5.00]

**1.** Hold down ZERO while it is turned on. (At measured value displaying)
ZERO
"b" will appear
b

**2.** Press ZERO to select either addition (b) or subtraction (−b).
ZERO
-b
No plus sign will be displayed.

**3.** Press START to confirm.
START
For addition, only "b" will appear.
b
0.00

**4.** Enter the addition/subtraction number.
-b
0.00
The 3rd digit: 0 to 9
The 2nd digit: 0 to 9
The 1st digit: 0 to 5
The 1st digit: ZERO to change the number. START to confirm and move to the next digit.
The 2nd digit: ZERO to change the number. START to confirm and move to the next digit.
The 3rd digit: ZERO to change the number.

**5.** Press START to confirm the addition/subtraction number.
START
Next is to program a coefficient.
Coefficient
a
0.00
1.00

For coefficient (a) [Range: 0.50 to 5.00]

**6.** Enter the coefficient.
a
0.00
1.00
The 3rd digit: 0 to 9
The 2nd digit: 0 to 9
The 1st digit: 0 to 5
The 1st digit: ZERO to change the number. START to confirm and move to the next digit.
The 2nd digit: ZERO to change the number. START to confirm and move to the next digit.
The 3rd digit: ZERO to change the number.

**7.** Press START to confirm the coefficient.
START

For default
Press the R button while setting up the Off-Set feature.
R
Factory default value
0.00
1.00

- The measurement range is shifted according to the offset settings.
- Screen images when offset is on

During measurement (Acid)
OFS
0.0 Brix%
--- Acid

After zero-setting with air
20.4°C
LLL Brix%
0.30 Acid
Offset "b" = addition of 0.30

## Measurement Value

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.

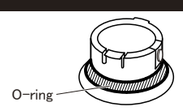
Acid
This unit measures and determines the acidity through electrical conductivity.
Chlorogenic acid is the primary acid found in coffee cherries.
The instrument measures the total acidity in a sample and converts it into chlorogenic acid concentrations.

## Automatic Temperature Compensation

The Automatic Temperature Compensation (ATC) feature is based on temperature detected by the thermo sensor located near the sensor area.
ATC may not work correctly when the temperature of the sensor area is not the same as the actual temperature of the sample. When measuring a hot or cold sample, let it sit on the sensor for approximately 20 seconds and measure, or take multiple readings until measurements become stable.

## Inserting Batteries

**Note** When the O-ring on the battery compartment cover is dirty or damaged, the water resistance may be compromised.
Lubricate the O-ring regularly.




**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.
Groove
CLOSE
OPEN

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

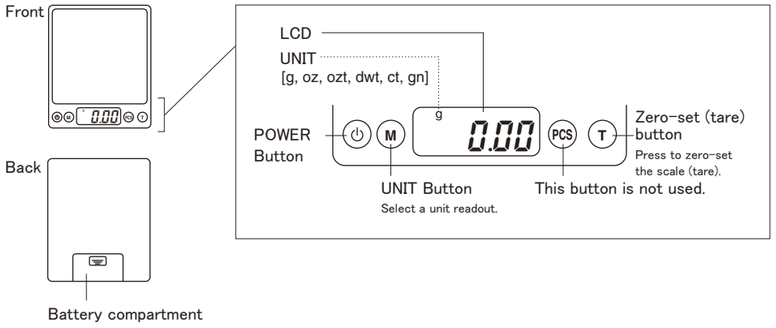
## About the Digital Scale

**Note** Remove the tape from the battery compartment.

### Contents

Main unit…1 Cover…2 (large and small) AAA batteries…2

### Parts




### How to Use the Digital Scale

**1.** Press the POWER Button.
"0" will appear.

**2.** Check the unit readout.
Press the UNIT button and select "g."
Unit
g
0.00
M

**3.** Place the item you wish to weigh onto the scale.
The item's weight will appear on the scale.
50.000

### Zero-setting and Weighing

**1.** Press the POWER Button.
"0" will appear.

**2.** Place the beaker on the scale.
The beaker's weight will appear on the scale.
50.000

**3.** Press the Zero-set button (tare)
"0" will appear.
T

**4.** Pour the sample you wish to weigh into the beaker.
The sample's weight will appear on the scale.
100

### Error Messages

Lo : The battery power is low. Replace with new alkaline AAA batteries.
O-LD : The item you are trying to weigh exceeds the permissable weight limit of the scale. Quickly remove it from the scale.

### Environmental conditions

- Do not expose the scale to extreme heat or cold.
- Do not expose the scale to any type of moisture.
- Use between 10 to 30℃ only.
- Use in a dry, clean environment.
- Any contact with or exposure to dust, debris, humidity, strong vibrations, extreme atmospheric conditions or other electronics may affect the accuracy of the scale and result in unreliable readings.

**Note**

- For precise measurements, place the item you wish to weigh onto the scale gently.
- Place the scale atop a flat, stable surface.
- The digital scale is remarkably durable. However, it is a precision instrument and should be used and treated with the utmost care.
- Use of the scale for purposes other than its intended use will result in damage to its internal components.
- Do not shake or drop the scale.

### Specifications

| | |
|---|---|
| Measurement range | 0.01 to 500.00g |
| Resolution | 0.01g |
| Unit | g, OZ, ozt, dwt, t, gn |
| LCD | LCD display with backlight |
| Auto-Off Feature | The scale will automatically turn off after 90 seconds of inactivity. |
| Power supply | Two (2) AAA alkaline batteries (Do not use rechargable batteries.) |
| Temperature Conditions | Ambient temperature: 10 to 30℃ |

## Safety Precautions

Read and follow all safety instructions before operating the instrument.

### ⚠ WARNING

- When measuring hazardous materials, use proper safety procedures, materials, and clothing to avoid personal injury. Anyone handling hazardous materials should understand its properties and its 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

- Before use, carefully read the instruction manual and fully understand the function and operation for each part of the instrument.
- ATAGO is not liable for any loss and damage caused by the measurement and use of this instrument.
- If this instrument is used to measure highly acidic samples, the sensor section and sample stage may be damaged, resulting in inaccurate measurements.
- Do not use any metal tools when applying sample to the sensor section.
  The metal can damage the sensor section. If the sensor section is scratched or damaged, inaccurate measurements will occur.
- When the unit needs to be washed, use water at a temperature not exceeding 50℃.
- Only use the specified battery type. Observe proper polarities, properly aligning the anodes and cathodes.
- 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 are excessive amounts of dust.
- Do not store the instrument in an extremely cool area.
- Do not set or drop heavy objects on top of the instrument.
- Loosen the battery compartment cover for air transportation.
- The instrument is water-resistant, not waterproof, and should not be submerged.

## Storage and Maintenance

Store the instrument in a dry place away from direct sunlight. Exposure to humidity may cause condensation inside, and exposure to direct sunlight may cause the plastic to warp.


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

- Cleaning
  Clean and dry the sensor area thoroughly after use, leaving no sample residues or water.
  〈For oily samples:〉
  Remove oily residues with mild soap, and then, rinse with water.
- Storage
  Store the instrument 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 sensor section 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 | Brix 0.0 to 60.0%<br>Acid 0.10 to 1.90%<br>10.0 to 40.0℃ |
| Resolution | Brix 0.1%<br>Acid 0.01%<br>0.1℃ |
| Measurement accuracy | Brix ±0.2%<br>Acid ±0.10% (0.10 to 1.00%)<br>Relative precision<br>±10% (1.01 to 1.90%)<br>±1℃ |

| | |
|---|---|
| Automatic temperature compensation range | 10 to 40℃ |
| Ambient temperature range | 10 to 40℃ |
| Measurement time | Approx. 3 seconds |
| Backlight | The backlight stays on for 30 seconds after any button is pressed. |
| Power supply | Two (2) AAA alkaline batteries |
| Battery life | Approx. 11,000 measurements (when using alkaline batteries) |
| International Protection class | IP65 |
| Dimensions and weight | 55(W)×31(D)×109(H)mm, 100g (main unit only) |

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