Future planning

Digital Hand-held “Pocket” IR Brix Meter

Optional Accessories

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>RE-39003</td>
<td>Spare cushion R (3 sets)</td>
</tr>
<tr>
<td>RE-39007</td>
<td>Spare cushion S (2 pieces)</td>
</tr>
<tr>
<td>RE-39415</td>
<td>PAL-HIKARI Silicone Cover</td>
</tr>
</tbody>
</table>

Plenty accurate with no cumbersome

All ATAGO products are designed and manufactured in Japan.

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Touch the surface of fruit

The Brix (sugar level) can be measured by placing the fruit on the sample stage with no need of cutting or squeezing. It requires no more cumbersome wiping and cleansing after each measurement.

Total inspection is possible.

All it takes is to put it against a fruit so each individual fruit’s Brix (sugar level) can be inspected. The measured fruits are intact and can then be shipped and sold after measurement.

Super lightweight that fits in your pocket

PAL-HIKARI is the world's most compact nondestructive Brix meter. The button located on the lateral side of the unit makes it possible to take measurements with one hand while the fruits that are on the tree. The unit is battery powered which makes it possible to take measurements anywhere.

Fits well on the surface of a fruit

The cushion on PAL-HIKARI allows for a secure surface contact with fruits. Regardless of the fruit shape, PAL-HIKARI’s fits snug which eliminates measurement discrepancies caused by external light interference or placement of the fruits.

Series total 360,000 unit

ATAGO is an established manufacturer of Brix meters since 1940. For Brix (sugar level), with ATAGO’s proven track of history in technology, PAL-HIKARI is developed on basis of this accomplished technology. ATAGO products are used in 154 countries worldwide.

2 ways to measure

Just touch the fruit and press the side button

Place a fruit, then just press the START button

*The graph is based on the apple scale

PAL-HIKARI is patent pending.
An acquaintance told me about PAL-HIKARI. We are using it to check whether the grapes are ready to ship and the quality when we try growing new varieties. I like how small and lightweight the PAL-HIKARI is, which makes it easy to measure grapes that are still on the vine. I’m also pleased with how reasonably priced the PAL-HIKARI is compared to devices made by other manufacturers.

Mochizuki Fruits Farm

User Testimonials

Even grapes still on the vine are easy to measure

PAL-HIKARI 2

<table>
<thead>
<tr>
<th>Measurement fruit</th>
<th>Grapes (use article within 15 mm in diameter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Range</td>
<td>Brix 10.0 to 25.0%</td>
</tr>
<tr>
<td>Resolution</td>
<td>Brix 0.1%</td>
</tr>
<tr>
<td>Measurement Accuracy</td>
<td>Brix ±1.5%</td>
</tr>
<tr>
<td>Repeatability</td>
<td>Brix ±1%</td>
</tr>
</tbody>
</table>

Automatic Temperature 15.0 to 30.0°C
Control Range [accurate only in the refrigerated temperature]
Ambient Temperature 15.0 to 30.0°C
International Protection IP64
Battery Life Approx. 4,000 measurements (when alkaline batteries are used)
Power Supply 2 x AAA alkaline batteries
Dimensions and Weight 64(W) × 6.4(D) × 11.5(H) cm, 153g (main unit and small sample stage S only)

Cat. No. 5452
IR Brix Meter × Brix Meter (Grapes)
-PAL-HIKARI 2
-PAL-0

Cat. No. 5552
IR Brix Meter × Brix Acidity Meter (Grapes)
-PAL-HIKARI 2
-PAL-BX/ACID2

Mochizuki Fruits Farm

Leading Varieties in Japan

- Black Beat
  Aug.

- Gigantic Peak (Kyoho)
  Aug.–Sept.

- Pione
  Aug.–Sept.

- Fujimixort
  Aug.–Sept.

- Queen Nina
  Aug.–Sept.

- Shine Muscat
  Aug.–Sept.

- Gorby
  Aug.–Sept.

- Nagano Purple
  Sept.–Oct.

- Suiho
  Sept.–Oct.

- Bulber
  Sept.–Oct.
The focus of attention, “Esashi Apple” is the top brand selected by JA (Japan Agricultural Co-operatives) Esashi from among apples grown in unique environment of Esashi region of Esashi-cho in the town of Oshu in Iwate Prefecture. They are chosen for their characteristic regional soil, climate, dwarfing technique, and keeping them unbagged.

After a selective selection process, only those with the right color, size, shape and sugar level are allowed to be called “Esashi Apple.” From the entire harvest, only 1% is selected as the special of the top grade.

In recent years, the auctioned price of the special selection grade is the fall’s biggest news. A box of 10kg special selection grade was sold during auctioned for 1,200,000 yen. The cost of an apple was 43,000 yen.

Esashi apple is proudly locally made over 40 years. Following the example of Esashi apple, many unique savory brands are beginning to appear in Japan.

The most expensive variety apple brand was “Sun Fuji.”

“Fuji” and “Sun Fuji”?

Originating in Fujisaki machi, a town located in Aomori prefecture, “Fuji apple” is grown worldwide with highest global production in the world. “Sun Fuji” and “Fuji” are thought as a different variety from each other but is both “Fuji apple.”

Matured “Fuji” is enclosed in brown paper bags to keep insect pests from getting to them before harvesting. Its distinctive characteristics are thin skin and vibrant color.

On the other hand, “Sun Fuji” is not bagged and is exposed to sunlight for a long duration of time. The color may not be quite as good but its sugar level is very high.

“Sun Fuji” branching from “Fuji” was branded to have sweet flavor while “Fuji” was branded for its pretty reddish color. From this branding, one variety of apple made it possible to satisfy different market needs such as “good color and storability” and “naturally distinct sweetness.”
Well known producers of the peaches are located in Yamanashi, Fukushima, Nagano prefectures in Japan. “World’s highest Brix peach” recorded in Guinness World Records can be found in Kishiwada city, Osaka prefecture. During the Guinness World Records challenge, the average peaches measured 22.2 Brix for “Masahime” produced by Maruya Farm in Kishiwadashi Kanechikachou.

General Brix level of peaches are about 10 to 12, so its surprising sweetness is nearly double the regular peaches. Kanechikachou has always been a famous place of peaches since ancient times but its nationwide awareness is low. It gained media publicity as a result of this Guinness World Records registration. The challenge to Guinness World Records was a long hard work that lasted three years, but by the effort of President Takahiro Matsumoto of “Maruya Farm”, “Kanechika’s peach” was able to push its brand power.

Peach of “Maruya Farm” is also selling on the internet, but is a very popular item that “sold out” in 15 minutes from the start of reservation.

Guinness World Records World’s Sweetest Peach

Leading Varieties in Japan

Ryomowase
Jan.
Hakosatukahou
Jan.– Aug.
Hakouhou
Jan.– Aug.
Shimozuhakutou
Jul.– Aug.
Nukazuki
Aug.
Akatsuki
Aug.
Kawanakajimahakutou
Aug.– Sept.
Sachiakane
Aug.– Sept.
Yuzora
Sept.
Amongst all the fruits grown in Japan, Asian pears have a long history with a recorded history of its consumption during the Yayoi period (300BC-300AD). Asian pears are one of the fruits popular in Japan since long ago, such poem in which “pears” have been included among the oldest existing collection of Japanese poetry; “Manyoushu.” It features a distinctive texture, with sweetness and juiciness. There are many varieties and with more than 150 kinds of varieties the sweet variety are known as Shintakanashi. Its Brix measures about 12 but because it is not very tart, the sweetness tastes even stronger.

Shintakanashi is also called “Jumbo Nashi” (jumbo pear) each weighing 600g to 1kg. Larger ones can even weigh about 1.5kg. Compared to the other Asian pears, this is almost 2 to 3 times larger than the regular Asian pears. Its large size and appearance, it is a popular variety for gifts. Popularity as a gift is not limited to Japan alone, there is a demand for gifts in Mid-Autumn Festival in Taiwan, and it is one of the brand pears exported overseas. The fact it is not as tart as other pears, and its good appearance wins popularity among other domestic pears.

## Story

Already available during Yayoi period

### PAL-HIKARI 12

<table>
<thead>
<tr>
<th>Measurement fruit</th>
<th>Asian Pear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Range</td>
<td>Brix: 10.0 to 16.0%</td>
</tr>
<tr>
<td>Resolution</td>
<td>Brix: ±1%</td>
</tr>
<tr>
<td>Measurement Accuracy</td>
<td>Brix: ±1%</td>
</tr>
<tr>
<td>Repeatability</td>
<td>Brix: ±1%</td>
</tr>
<tr>
<td>Automatic Temperature</td>
<td>5.0 to 35.0°C</td>
</tr>
<tr>
<td>Control Range</td>
<td>*Adjustable even if ambient temperature</td>
</tr>
</tbody>
</table>

| Ambient Temperature     | 5 to 35°C         |
| International Protection Class | IP64 |

| Battery Life             | Approx. 4,000 measurements (when alkaline batteries are used) |
| Power Supply             | 2 x AAA alkaline batteries |

| Dimensions and Weight   | 6.19W × 4.45D × 11.59H cm, 120g (Main Unit only) |
| Dimensions and Weight   | 6.19W × 4.45D × 11.59H cm, 120g (Main Unit only) |

Cat.No.5462
IR Brix Meter × Brix Meter (Asian Pear)
- PAL-HIKARI 12
- PAL-0

Cat.No.5463
IR Brix Meter × Brix Acidity Meter (Asian Pear)
- PAL-HIKARI 12
- PAL-BX|ACID12
Acidity x Brix

good sourness, good sweetness, perfect flavor

Light x Refraction

from outside, from inside, good flavor

A combo set that includes PAL-HIKARI, a non-destructive IR Brix Meter that can measure the sugar content just by being pressed against the fruit, and a Brix meter that can measure the sugar content of squeezed fruit juice is now available. Special scales are available for each fruit. Choose the appropriate combo set.

A combo set that includes PAL-HIKARI, a non-destructive IR Brix Meter that can measure the sugar content just by being pressed against the fruit, and PAL-BX|ACID, a Brix-acidity meter that can measure the sugar content of squeezed fruit juice is now available. Special scales are available for each fruit. Choose the appropriate combo set.

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<tr>
<th>Cat.No.</th>
<th>Part Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>5552</td>
<td>IR Brix Meter × Brix Meter (Grapes) PAL-HIKARI 2 + PAL-0</td>
</tr>
<tr>
<td>5555</td>
<td>IR Brix Meter × Brix Meter (Apple) PAL-HIKARI 5 + PAL-0</td>
</tr>
<tr>
<td>5560</td>
<td>IR Brix Meter × Brix Meter (Peach) PAL-HIKARI 10 + PAL-0</td>
</tr>
<tr>
<td>5562</td>
<td>IR Brix Meter × Brix Meter (Asian Pear) PAL-HIKARI 12 + PAL-0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cat.No.</th>
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</tr>
</thead>
<tbody>
<tr>
<td>5652</td>
<td>IR Brix Meter × Brix-Acidity Meter (Grapes) PAL-HIKARI 2 + PAL-BX</td>
</tr>
<tr>
<td>5655</td>
<td>IR Brix Meter × Brix-Acidity Meter (Apple) PAL-HIKARI 5 + PAL-BX</td>
</tr>
<tr>
<td>5662</td>
<td>IR Brix Meter × Brix-Acidity Meter (Asian Pear) PAL-HIKARI 12 + PAL-BX</td>
</tr>
</tbody>
</table>

**PAL-O Specifications**

- **Measurement**: Brix 0.0 to 33.0%, Temperature 10 to 100°C
- **Resolution**: Brix 0.1%, Temperature 0.1°C
- **Measurement Accuracy**: Brix ±0.2%, Temperature ±1°C
- **Automatic Temperature Control Range**: 10 to 100°C
- **Ambient Temperature**: 10 to 40°C
- **Protection Class**: IP65
- **Power Supply**: 2 x AAA alkaline batteries
- **Dimensions and Weight**: 53(W) x 31(D) x 93(H)mm, 100g

**Pocket Brix-Acidity Meter Specifications**

<table>
<thead>
<tr>
<th>Measurement Range</th>
<th>Brix 0.0 to 60.0%, Acid 0.1 to 4.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PAL-BX</td>
</tr>
<tr>
<td></td>
<td>PAL-BX</td>
</tr>
<tr>
<td></td>
<td>PAL-BX</td>
</tr>
</tbody>
</table>

For more specification information, contact ATAGO.
**Uses**

**Q** Does fruit need to be prepared?

**A** No need to cut, strain, or squeeze fruit.

**Q** Does skin color affect measurement? (Red and green apple)

**A** Color does not affect.

**Q** What to look out for when storing.

**A** Make sure to dry the cushion well. Take out batteries when planning to not to use for a long duration of time.

**Q** Can measurement be taken for fruits during its growth?

**A** Measurement can be taken while the fruit is on the tree. Carefully place the cushion on the fruit not to let it fall off the branch.

**Q** Measuring the same fruit, the value is different.

**A** Brix level of fruit differs depending on such factor as exposure to sunlight and area of the fruit. This unit measures the area where the sample stage is placed against. *Please reference “When measurement value does not seem to be correct…”*

**Q** What fruit can be measured?

**A** PAL-HIKARI is a fruit specific instrument with model for each fruit. *Please reference pg.16 “Future Planning.”*

**Q** I would like to measure the sugar content of processed products such as jams.

**A** Packaged sets products are available that comes with pocket Brix meter (PAL-0) and pocket Brix-acidity meter.

**When measurement value does not seem to be correct…**

- **POINT** External light interference
  - Avoid light from entering the sample stage. Light entering the sample stage will cause measurement error and cause greater margin of error.

- **POINT** Effect of fruit temperature
  - Be sure to take measurement after allowing the sample fruit to acclimate to PAL-HIKARI. *Place them under same condition for a period of time.*

- **POINT** Effect of contact between the sample stage and fruit
  - Properly place the sample stage of PAL-HIKARI against a fruit. Improper contact will allow external light to enter.

- **POINT** Effect of water droplet, soiled area, and condition of the fruit
  - Avoid fruit’s surface with water droplets or soiled area. Correct measurements cannot be achieved for soft and spotty fruits caused by elapsed time since harvesting.