

# Reasons to choose the MASTER

## 1 Water Resistant



The concept of a washable hand-held analog unit is exceptional. After measuring, the instrument can be cleaned with running water under a faucet. The new structural-design of these units allows them to be washed whenever necessary. Rated IP65 (dust tight and water resistant).



## α·H

## 5 Durability



The MASTER series has passed all water resistance, dust resistance, and drop tests. Instruments were subjected to water jets from four directions, dropped from a height of one meter onto an oak platform, and withstood the pressure changes of air travel.

## 6 Calibration



The α and H types can now be calibrated with the new waterproof calibration screw. All MASTER models can be calibrated by end-user.

The world's first feature

## 2 Hygienic Design



The MASTER series was also designed with a smooth and easy-to-clean grip, eliminating the possibility of food and samples being trapped which can result in contamination and bacterial growth.

## 3 Visibility



Efficiently using an analog unit depends on how easily the measured value can be read. Extensive research and the use of quality optics result in a measurement scale that is very bright, creating a high contrast to see clearly where the boundary intersects the memory lines of the scale.

## 4 Automatic Temperature Compensation (ATC)

## α·T·H



The newly designed ATC system allows the MASTER series to read more accurately than any comparable unit. ATAGO has applied for a patent on the design of the improved ATC system. The MASTER series reads more accurately than any comparable unit in the market.

## 7 Automatic Sample Distribution (ASD)



ATAGO has developed a spoon-shaped tip that automatically spreads the sample across the prism. This makes the instrument even more user-friendly, saving valuable time.

## 8 Repair and Service



ATAGO has established a close network of customers by providing excellent customer service and support. When an ATAGO instrument needs servicing, not only is each customer treated with respect, but they are also provided with detailed methods and userspecific suggestions on sampling and taking measurements, based on individual needs.

## 9 Reputation for Quality



ATAGO has built a firm reputation for reliability and quality during its over 70 years history. We are a strong company that exports to over 154 countries with continued growth expectations. ISO 9001 certified, along with our integrated system for producing and marketing our products, based on the "Plan-Do-Check-Act" cycle, is essential to the continued quality and to the promoting of the ATAGO name.

# Simple Operation



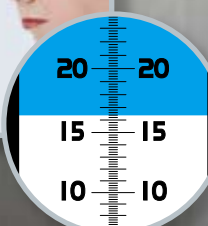
1 Apply 1-2 drops onto the prism.



2 Close the daylight plate. View the scale through the eyepiece.



3 Read the measurement value where the boundary line intersects the scale.



## Applications

-Measuring sugar concentration, concentration, Brix and Refractive Index-

### Honey



Honey

### Jam, Syrup



Jam, syrup, confectioneries

### Soy milk



Soy milk

### Condiments



Condiment, seasonings, ketchup, various sauces, soy sauce

### Wine



Grapes, wine must

### Drink



Fruit juice, soft drink, carbonated beverage

### Cooking



Chinese noodle soup, various soup, various sauces

### Agriculture



Fruit and vegetable juice, leaf juice, stem juice, root juice

### Salinity



Sodium chloride solution, sea water, pickles

### Machine Tools



Firefighting foam, soluble cutting oil

### Chemicals and medicine



Brine, deicing solution, medicine, chemical, cosmetics, cleaning solution

### Clinical



Urine, serum

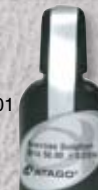
## Optional Accessories



**Small Volume Daylight Plate With Hinge Pin**  
For metal body model  
Parts.No. RE-2311-58M  
For plastic body model  
Parts.No. RE-2391-50M



**Super Extractor**  
Parts.No. RE-29401



**Sucrose solution (for Brix confirmation)**  
Parts.No. RE-110010 10% Sucrose  
Parts.No. RE-110020 20% Sucrose  
Parts.No. RE-110030 30% Sucrose  
Parts.No. RE-110040 40% Sucrose  
Parts.No. RE-110050 50% Sucrose  
Parts.No. RE-110060 60% Sucrose

All ATAGO refractometers are designed and manufactured in Japan.

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

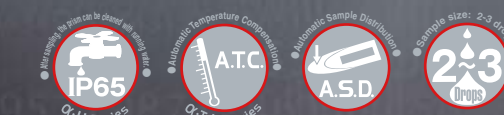
※Specifications and appearance are subject to change without notice.

V.02 11103000PP Printed in Japan



The Ultimate Hand-Held Refractometer Unsurpassed in Function, Operation, and Design

# MASTER



Design Registration No.000379326-0001, 000379326-0002 (EU)  
ZL 2005 3 0116403.4.5 (China), D111526 (Taiwan), D555, 549 (U.S.A.),  
1255763, 1255764, 1255765, 1255766, 1255767 (Japan)  
Patent Granted in countries around the world.

**About the Trade Mark:**  
Year 2005 ATAGO was established 65 years ago and we have been developing, manufacturing, and marketing Refractometers based on our in-depth study of optics. This year we have released our NEW Hand-Held Refractometer series, the "MASTER" to support and meet our customer's needs. The NEW "MASTER" series is a fitting name to match its ultimate performance. The trade mark "光" is the Japanese Kanji which means "light". The decision to use this Kanji as a trade mark for the MASTER series is to emphasize that this product was designed and manufactured in Japan. With the multitude of imitation products out in the market today, ATAGO is maintaining our identity as the master of manufacturing quality instruments. We, ATAGO, would like to be your business partner and to be the "light" to continue towards a bright future together.



Hand-held Refractometer

# MASTER series

Choose the right model for your sample, based on the features and materials of the instrument.



## Material 2 types

Choose either metal or plastic.



### Metal

#### Die-cast aluminum

Ideal for the agriculture industry, metal working fluids, and various high-temperature samples. Resistant to organic solvents.



### Plastic

#### PBT (polybutylene terephthalate)

Resistant to salty and acidic samples.

## Features 4 types

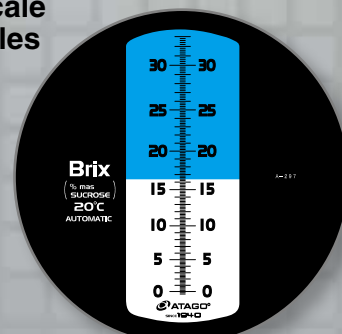
Both the  $\alpha$  and T types are equipped with the Automatic Temperature Compensation feature. Choose the  $\alpha$  type for the added feature of IP 65 water-resistance. The H type is the heat-resistant version of the  $\alpha$  type.

| Series                             | $\alpha$     | T | M | H            |
|------------------------------------|--------------|---|---|--------------|
| Water resistant                    | ●            | — | — | ●            |
| Automatic temperature compensation | ●            | ● | — | ●            |
| Heat resistant                     | —            | — | — | ●            |
| Calibration                        | ● <b>NEW</b> | ● | ● | ● <b>NEW</b> |

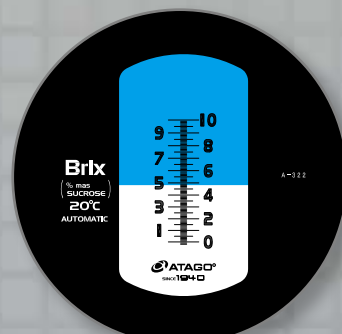
## Scale Brix or other special scales

Custom scales are available upon request.

### Brix scale examples

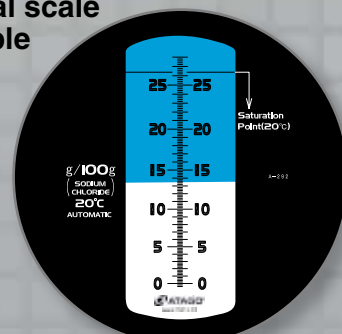


MASTER- $\alpha$   
Brix 0~33%



MASTER-10 $\alpha$   
Brix 0~10%

### Special scale example



MASTER-S28 $\alpha$

## Understanding model names

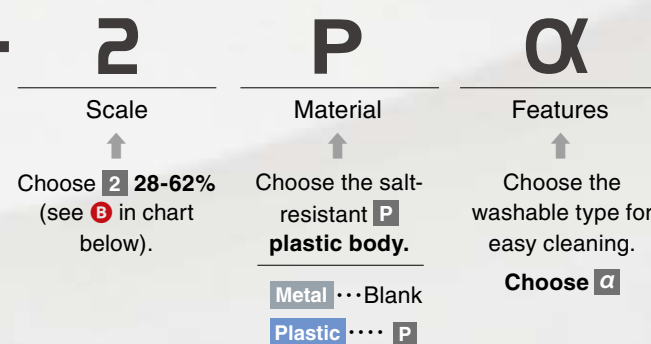
A model name consists of the scale (sample name), material, and feature type.

### Brix Scale

## MASTER-2 P $\alpha$

#### Example Measuring sauces

- Sample information
- About 40% Brix (see  $\alpha$  in chart below)
  - Salty
  - Oily

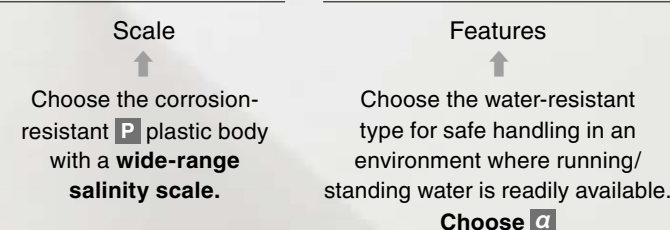


### Special Scale

## MASTER-S28 $\alpha$

#### Example Measuring brine

- Sample information
- Salty
  - Running/standing water around
  - High in salt concentration



## Brix of Various Samples Refractive index and Brix of various types of samples

| Brix (%) | Food industry   | Chemical industry                                       | Medical Science industry                              | Memory (Brix) |     |     |     |
|----------|---|---|---|---------------|-----|-----|-----|
|          |   |   |   | (1)           | 10  | 20  | 53  |
| 1.333    | <b>Drinks</b><br>Green tea  | <b>Water</b><br>Cutting oil (emulsion)                  | Methanol<br>Saline<br>Aloe extract<br>Sea water       | 0             | 0   | 0   | 0   |
| 1.34     | <b>5</b><br>Beer<br><b>Fruits / Vegetables</b><br>Tomato<br>Strawberry<br>Lemon | Miso soup<br>Nickel plate liquid                        | Chlorella extract                                     | 33%           | 10% | 20% | 53% |
| 1.35     | <b>10</b><br>Coffee<br>Soy milk<br>Cola<br>Milk                                 | Beef curry<br>Demiglace (sauce)<br>Orange jelly         | Gelatin liquid<br>Serum                               |               |     |     |     |
| 1.36     | <b>15</b><br>Lactic acid-bacteria beverage                                      | Freon113  |   |               |     |     |     |
| 1.37     | <b>20</b><br>Canned syrup   | Silicone solution (emulsion)<br>Electrolyte<br>Freon 11 | Acetone<br>Ethanol<br>Acetic acid<br>Saturated saline |               |     |     |     |
| 1.38     | <b>30</b><br>Ketchup  | Acrylonitrile   |   |               |     |     |     |
| 1.39     | <b>40</b><br>Soy sauce<br>Sauce $\alpha$  | Jam<br>Low-sugar jam                                    |   |               |     |     |     |
| 1.40     | <b>50</b><br>Egg yolk   | Silicone oil  | Octane  |               |     |     |     |
| 1.41     | <b>60</b><br>Butter   | Ethylene glycol<br>Propylene glycol                     |   |               |     |     |     |
| 1.42     | <b>70</b><br>Olive oil  | Jam<br>Honey<br>Honey Starch Syrup                      |   |               |     |     |     |
| 1.43     | <b>80</b>   | Diesel oil<br>Ricinus                                   | Glycerin  |               |     |     |     |
| 1.44     | <b>90</b>   | Polyvinyl chloride (PCV)<br>Styrene<br>Asphalt          |   |               |     |     |     |

## Specifications

### Brix Scale

| Range (Minimum)      | Series        | $\alpha$               |                   | T                      |           | M                   |           |
|----------------------|---------------|------------------------|-------------------|------------------------|-----------|---------------------|-----------|
|                      |               | Metal                  | Plastic           | Metal                  | Plastic   | Metal               | Plastic   |
| ①<br>0~33%<br>(0.2%) | Model         | MASTER- $\alpha$       | MASTER-P $\alpha$ | MASTER-T               | MASTER-PT | MASTER-M            | MASTER-PM |
|                      | Cat.No.       | 2311                   | 2391              | 2312                   | 2392      | 2313                | 2393      |
|                      | Accuracy      | ±0.2% *±0.1% (10~30°C) |                   | ±0.2% *±0.1% (10~30°C) |           | —                   |           |
|                      | Size & Weight | 3.2x3.4x20.3cm/155g    |                   | 3.2x3.4x20.3cm/155g    |           | 3.2x3.4x20.3cm/155g |           |

| ②<br>28~62%<br>(0.2%) | Model         | MASTER-2 $\alpha$      | MASTER-2P $\alpha$ | MASTER-2T              | MASTER-2PT | MASTER-2M           | MASTER-2PM |
|-----------------------|---------------|------------------------|--------------------|------------------------|------------|---------------------|------------|
|                       | Cat.No.       | 2321                   | 2941               | 2322                   | 2942       | 2323                | 2943       |
|                       | Accuracy      | ±0.2% *±0.1% (10~40°C) |                    | ±0.2% *±0.1% (10~40°C) |            | —                   |            |
|                       | Size & Weight | 3.2x3.4x20.3cm/155g    |                    | 3.2x3.4x20.3cm/155g    |            | 3.2x3.4x20.3cm/155g |            |

| ③<br>58~90%<br>(0.2%) | Model         | MASTER-3 $\alpha$      | MASTER-3P $\alpha$ | MASTER-3T              | MASTER-3PT | MASTER-3M           | MASTER-3PM |
|-----------------------|---------------|------------------------|--------------------|------------------------|------------|---------------------|------------|
|                       | Cat.No.       | 2331                   | 2951               | 2332                   | 2952       | 2333                | 2953       |
|                       | Accuracy      | ±0.2% *±0.1% (10~40°C) |                    | ±0.2% *±0.1% (10~40°C) |            | —                   |            |
|                       | Size & Weight | 3.2x3.4x16.8cm/130g    |                    | 3.2x3.4x16.8cm/130g    |            | 3.2x3.4x16.8cm/130g |            |

| ④<br>45~82%<br>(0.2%) | Model         | MASTER-4 $\alpha$      | MASTER-4P $\alpha$ | MASTER-4T              | MASTER-4PT | MASTER-4M           | MASTER-4PM |
|-----------------------|---------------|------------------------|--------------------|------------------------|------------|---------------------|------------|
|                       | Cat.No.       | 2341                   | 2961               | 2342                   | 2962       | 2343                | 2963       |
|                       | Accuracy      | ±0.2% *±0.1% (10~40°C) |                    | ±0.2% *±0.1% (10~40°C) |            | —                   |            |
|                       | Size & Weight | 3.2x3.4x16.8cm/130g    |                    | 3.2x3.4x16.8cm/130g    |            | 3.2x3.4x16.8cm/130g |            |

| ⑩<br>0~10%<br>(0.1%) | Model         | MASTER-10 $\alpha$     | MASTER-10P $\alpha$ | MASTER-10T             | MASTER-10PT | MASTER-10M          | MASTER-10PM |
|----------------------|---------------|------------------------|---------------------|------------------------|-------------|---------------------|-------------|
|                      | Cat.No.       | 2371                   | 2981                | 2372                   | 2982        | 2373                | 2983        |
|                      | Accuracy      | ±0.2% *±0.1% (10~30°C) |                     | ±0.2% *±0.1% (10~30°C) |             | —                   |             |
|                      | Size & Weight | 3.2x3.4x20.3cm/155g    |                     | 3.2x3.4x20.3cm/155g    |             | 3.2x3.4x20.3cm/155g |             |

| ②0<br>0~20%<br>(0.1%) | Model         | MASTER-20 $\alpha$     | MASTER-20P $\alpha$ | MASTER-20T             | MASTER-20PT | MASTER-20M          | MASTER-20PM |
|-----------------------|---------------|------------------------|---------------------|------------------------|-------------|---------------------|-------------|
|                       | Cat.No.       | 2381                   | 2991                | 2382                   | 2992        | 2383                | 2993        |
|                       | Accuracy      | ±0.2% *±0.1% (10~30°C) |                     | ±0.2% *±0.1% (10~30°C) |             | —                   |             |
|                       | Size & Weight | 3.2x3.4x20.7cm/165g    |                     | 3.2x3.4x20.7cm/110g    |             | 3.2x3.4x20.7cm/110g |             |

| ⑤3<br>0~53%<br>(0.5%) | Model         | MASTER-53 $\alpha$      | MASTER-53P $\alpha$ | MASTER-53T              | MASTER-53PT | MASTER-53M          | MASTER-53PM |
|-----------------------|---------------|-------------------------|---------------------|-------------------------|-------------|---------------------|-------------|
|                       | Cat.No.       | 2351                    | 2971                | 2352                    | 2972        | 2353                | 2973        |
|                       | Accuracy      | ±0.5% *±0.25% (10~30°C) |                     | ±0.5% *±0.25% (10~30°C) |             | —                   |             |
|                       | Size & Weight | 3.2x3.4x16.8cm/130g     |                     | 3.2x3.4x16.8cm/130g     |             | 3.2x3.4x16.8cm/130g |             |

### Heat resistant

| Series        | H                    |                 |                 |                  |
|---------------|----------------------|-----------------|-----------------|------------------|
| Material      | Metal                |                 |                 |                  |
| Model         | MASTER-50H           | MASTER-80H      | MASTER-93H      | MASTER-100H      |
| Cat.No.       | 2354                 | 2364            | 2374            | 2384             |
| Range         | Brix 0.0~50.0%       | Brix 30.0~80.0% | Brix 45.0~93.0% | Brix 60.0~100.0% |
| Minimum       | 0.5%                 |                 |                 |                  |
| Accuracy      | ±0.5% *±0.25%        |                 |                 |                  |
| Size & Weight | 3.2x3.4x 16.8cm/130g |                 |                 |                  |

### Special Scale

| Sample        | Coolant  | Battery Coolant   | Battery Coolant   | Refractive index |
|---------------|--|---|---|------------------|
| Series        | M  | M   | M   | M                |
| Material      | Plastic  |   |   | Metal            |
| Model         | MASTER-BR                                      | MASTER-BC   | MASTER-BCF  | MASTER-RI        |
| Cat.No.       | 2930   | 2931  | 2932  | 2612             |
| Scale         | ① propylene glycol<br>② ethylene glycol        | ① ethylene glycol freezing temp<br>② propylene glycol freezing temp<br>③ battery fluid d20/20 | ① ethylene glycol freezing temp<br>② propylene glycol freezing temp<br>③ battery fluid d20/20 | Refractive index |
| Range         | ① 0 to 70% 0 to -50°C<br>② 0 to 70% 0 to -50°C | ① 0 to -50°C<br>② 0 to -50°C<br>③ 1.150 to 1.300  | ① 32 to -60°F<br>② 32 to -50°F<br>③ 1.150 to 1.300  | 1.435 to 1.520   |
| Minimum Scale | 5% 5°C   | ① 5°C ② 5°C ③ 0.01  | ① 10°F ② 10°F ③ 0.01  | 0.001            |
| Size & Weight | 3.3x3.3x16.8cm, 90g                            |   |   |                  |

| Sample                         | Seawater                                    | Seawater        | Salinity                            | Salinity     | Salinity (Wide range)               | Salinity (Wide range) |
|--------------------------------|---|-----------------|-------------------------------------|--------------|-------------------------------------|-----------------------|
| Series                         | $\alpha$                                    | M               | $\alpha$                            | M            | $\alpha$                            | M                     |
| Material                       | Plastic                                     |                 | Plastic                             |              | Plastic                             | Plastic               |
| Model                          | MASTER-S/MIll $\alpha$                      | MASTER-S/MIll M | MASTER-S10 $\alpha$                 | MASTER-S10 M | MASTER-S28 $\alpha$                 | MASTER-S28 M          |
| Cat.No.                        | 2491  | 2493            | 2471                                | 2473         | 2481                                | 2483                  |
| Scale                          | ① Salinity ② Specific gravity               |                 | Sodium chloride                     |              | Sodium chloride                     |                       |
| Range                          | ① 1% ② 0.001                                |                 | 0.0 to 10.0g/100g                   |              | 0.0 to 28.0g/100g                   |                       |
| Minimum Scale                  | ① 0 to 100% ② 1.000 to 1.070                |                 | 0.1g/100g                           |              | 0.2g/100g                           |                       |
| Measurement Accuracy           | ① ±2% *±1%<br>② ±0.001 *±0.0005 (10 to 30%) |                 | ±0.2g/100g *±0.1g/100g (10 to 30°C) |              | ±0.2g/100g *±0.1g/100g (10 to 30°C) |                       |
| International Protection Class | IP65  |                 | IP65                                |              | IP65                                |                       |
| Size & Weight                  | 3.3x3.3x20.4cm, 100g                        |                 | 3.3x3.3x20.4cm, 100g                |              | 3.3x3.3x20.4cm, 100g                |                       |

IP65 = dust-tight and protected against water jets (except eye piece)  
\*Repeatability