### Specifications

<table>
<thead>
<tr>
<th>Measurement items</th>
<th>Measurement range</th>
<th>Minimum indication</th>
<th>Measurement accuracy</th>
<th>Measurement temperature</th>
<th>High and low limit settings</th>
<th>Display items</th>
<th>Output items</th>
<th>Output method</th>
<th>Alarm output</th>
<th>Power supply</th>
<th>Cable</th>
<th>Materials in contact with the solution</th>
<th>Light source</th>
<th>Pressure resistance</th>
<th>Relative humidity</th>
<th>International protection class</th>
<th>Dimensions and weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>One of Refractive Index (nD), Brix (temperature compensation according to sucrose solution), concentration (%) (temp. compensation according to samples), and temperature</td>
<td>Refractive Index (nD) 1.32000 to 1.55700, Brix 0.00 to 100.00%</td>
<td>Refractive Index (nD) 0.0001 or 0.00001, Brix 0.1% or Brix 0.01% (by selection)</td>
<td>Refractive Index (nD) ±0.00010, Brix±0.05%</td>
<td>5 to 100°C (CIP up to 130°C for no more than 30 minutes)</td>
<td>High and low control limits can be set by the keys.</td>
<td>Refractive Index (nD), Brix, concentration (%), temperature (°C)</td>
<td>Either Refractive Index (nD), Brix or concentration (%), and temperature (°C)</td>
<td>RS-232C, DC4 to 20mA</td>
<td>Open-collector output for high and low limit settings (alarm output)</td>
<td>AC100 to 240V, 50/60Hz</td>
<td>Detection section - Calculation display section (power supply 12V and RS-485)</td>
<td>Length: standard 15m (maximum up to 200m)</td>
<td>Prism: Sapphire</td>
<td>Prism stage: SUS316</td>
<td>O-ring: Kalrez®</td>
<td>LED (D line approximation)</td>
<td>1.0MPa (detection section)</td>
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<tr>
<td>### Physical Dimensions</td>
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</table>

- **Detection section**
  - Weight: 3.3kg
- **Calculation display section**
  - Weight: 3.3kg

All ATAGO refractometers are designed and manufactured in Japan.

*Specifications and appearance are subject to change without notice.*
Preventive quality measures means inspecting the whole process.

Continuous monitoring with a process refractometer. The PRM-100 works by measuring the light refraction between the prism on the detection section and the liquid running through the pipe where it is installed. This instrument can be mounted directly on the pipe or on a bypass. Process refractometers are indispensable in food, beverage and pharmaceutical plants for checking actual product, as well as serving to measure and control concentrations of industrial solutions such as cutting oils, quenches, and washes. The unit reads samples in refractive index, Brix, or a user-defined concentration, and also displays temperature. Data outputs allow you to automatically control mixing ratios.

Detection section
Mounts into a piping system and measures the refractive index of the liquid inside. The refractive index and temperature data signals are sent via RS-485 to the Display section.

Calculation display section
Converts signals received from the detection section into Brix or concentration values, automatically compensating for the temperature, and displays the readings on the LCD.

Keeping the Prism Clean
1. Prism Coating
In any in-line device, particulate matter in a sample may start to adhere to the sensor and build up over time, causing false readings - refractometers are no exception. The PRM-100 has a special coating on the prism surface which prevents deposits from adhering.

2. Ultrasonic Cleaning Device (Optional)
In the case of a sample that consistently adheres, we recommend the US-1 ultrasonic cleaning device. The vibration generator is mounted directly, foaming the prism (see above right).

A significantly improved thermo-sensor quickly adapts to sudden temperature changes, keeping measurements stable.

Response Time to a Sudden Temperature Change.

The easy-to-read display and multiple output options allow you to monitor operations throughout the plant.

The LED display offers improved visibility from a distance over a conventional LCD. Measurement values are displayed in orange, and temperatures in blue.

Power supply included in the calculation display section.

Optional Alarm Output for when the reading goes outside the user’s set range.

ATAGO offers a variety of methods to display readouts to your testing environment.

PC-Programmable User Scale (Conc.): Programming a user scale is no longer a hassle! Simply create a refractive index data table, using known concentrations in a .txt file, and send it to the refractometer via RS-232C on any PC with I2C or max485.

Easy Programming!

Measurement Principles
Refractometry is based on the principle that as the density of a substance increases, its Refractive Index rises proportionally.

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Each stage that a bad batch passes through costs a plant progressively more money. In this example, if an entire lot of product has to be discarded, the loss is $270,000 in production cost, plus $315,000 in expected profit. Furthermore, the consequences of a bad batch slipping through entirely could cost millions if a recall is required!

Rewards of early detection:

- **Save money and prevent a bad batch!**
  - Example: 1,000,000 units at $1 each
- **$70,000 lost**
- **$150,000 lost**
- **$270,000 lost**

More than money is at stake. In the event of a recall, the damage to a company’s reputation could be irreparable. Sales will plummet, and the company’s future may be in doubt.

**Stay a step ahead of danger**

That is the highest priority. I wanted my finished products to be consistently up to standards. Back then, we could never figure out what caused unreliable batches. One day, we made a decision to track and keep any kind of data that could help us. That data showed us that even seemingly impossible mistakes can happen. To avoid any mistake, it is necessary to anticipate every possible mistake-causing scenario.

When we track and keep the data, our factory immediately transforms into a facility that identifies the potential problems early and never produces a defective product.

**Initial investments in refractometers can avoid wasting resources or a reputation-damaging recall!**

**Flow meters alone are not enough**

Flow meters cannot detect concentration levels, thus out-of-spec product can slip by unnoticed. In the blending process, accurately monitoring the ratio of ingredients is a must. Process refractometers are absolutely necessary for measuring concentrations in real-time.

**Know the actual concentration!**

Using a PLC, refractometers can give feedback to the pumps to adjust the mixing ratio.

**Application Examples**

**Preparation**

- **Concentrates & syrups**
  - Measure the Brix of the concentrate to estimate ratios for reconstitution.
- **Fermentation (wine, beer, soy sauce)**
  - Brix decreases as sugars are converted to alcohol.
- **Breweries**
  - Measurewort levels when boiling (on a bypass from the main tank).

**Blending Process**

- **Beverage concentrate**
  - Monitor and adjust Brix when evaporating to estimate ratios for reconstitution.

**Packaging**

- **Soft drinks & fruit juices**
  - Check consistency before final fill and shipment.
- **Coffee extracts**
  - Evaporation will raise the Brix to your target levels.
- **Invert sugar, cornstarch**
  - Use the user scale to differentiate between batches of invert and invert sugar.
- **Coolants & anti-freeze**
  - Glycol must be prepared to the proper strength to ensure a sufficiently low freeze point.
- **Sodium hydroxide solution**
  - Sodium hydroxide and other alkaline solutions are used for wash solutions, soap manufacturing, and neutralizing acids.
- **Medicines**
  - Check the final concentration of liquid medicines to ensure compliance.

**Others**

- **Wastewater**
  - Automate a system that redirects suitable water for recirculation or waste, based on the solids content!
- **Multiple products in one line**
  - Minimize waste and turnaround time by noticing a concentration shift between different products.
- **CIP-to-Sample**
  - The readings can be used to infer when CIP solution has left the pipe completely. This significantly reduces the risk of producing a contaminated batch.
- **Free Demonstration Unit Available**
  - It can also help minimize the amount of product discarded.

**Ingredients**

- **Unknown cause**
  - Free Demonstration Unit Available

**Refractometer Solutions**

- **CIP contamination**
  - Detects the concentration change in real-time.
- **Equipment failure**
  - Fully automated measurements leave no risk for human errors.
- **Mistake during a batch test**
  - If you test at every production stage, you can identify a defective batch before it continues down the line.
- **Defective batch from a previous stage**
  - Detects the concentration change in real-time.
- **Unknown cause**
  - Detects the concentration change in real-time.

**Concentrates & syrups**

Measure the Brix of the concentrate to estimate ratios for reconstitution.

**Fermentation (wine, beer, soy sauce)**

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User Testimonials

A Beverage Bottler

We are using an in-line refractometer when diluting syrups. We can easily calculate the mixing ratio from the Brix reading, and control the flow using the alarm output for when the levels go out of spec. The refractometer allows us to monitor flow conditions in real-time. Before buying, they had us try a demonstration unit to determine the best location along the production line to mount the sensor.

A Food Processor

With food safety issues becoming more and more of a focus worldwide, manufacturers are required to adhere to stricter quality control standards, such as HACCP and ISO22000. The continuous refractometer data are more reliable than batch testing because it’s basically checking the entire product. We have a meter in place right before packaging to ensure the quality of the final product. We are also using an ATAGO digital bench-top refractometer in the QA lab. Our contact at ATAGO visits our facility regularly to make sure that both units are working fine.

A Chemical Plant

We own multiple units; one for each line, designated for a particular sample. We have the direct concentration level programmed into the “Conc.” scale for displaying readings and sending data. Automating this inspection system has greatly improved efficiency and reduced our costs, and the measurements are quicker than manual interval testing.

A Sugar Refinery

The advantage of the process refractometer is that it can be mounted directly into the pipe to measure the whole flow. With the data output, a Brix measurement at a particular date and time can be recorded for future reference. We are another unit to measure wastewater. ATAGO helped us select the right sample inlet unit and recommended methods to mount the instrument correctly, based on each application.

A Paper Plant

We have a refractometer to measure the starch solutions. The necessary concentration of the solution varies based on what type of paper we are producing. In-line testers are essential to prevent imperfect batches. It has been several years since we installed the unit, and we always receive excellent customer service from ATAGO whenever we have questions. Recently, our other locations purchased more units for the same purpose.

Why Choose ATAGO?

1. Proud Heritage and Experience

ATAGO has over 70 years of experience in optical instrument manufacturing. With our expertise cultivated over decades, as well as an extensive selection of instruments, we can meet a variety of measurement needs including highly specialized industries.

2. Industry-Leading Technology

Reflection of light has been our specialty throughout the existence of ATAGO, and we strive for perfection in optical systems. We listen to end-user feedback from 154 countries and continuously push the limit of refractometry.

3. Trusted Product Support

We dedicate ourselves on the high durability and low failure rate of ATAGO products. Our repair service is carried out in a timely manner, Calibration certificates are available.

List of Sample Inlet Unit

<table>
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<tr>
<th>Connection system</th>
<th>Diameter</th>
<th>Profile</th>
<th>Installation</th>
</tr>
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<tbody>
<tr>
<td>IDF/ISO clamp union (ferrule)</td>
<td>15~35</td>
<td>Straight type</td>
<td>Installed vertically</td>
</tr>
<tr>
<td>IDF/ISO screw union (screw)</td>
<td>15~35</td>
<td>Straight type</td>
<td>Installed horizontally</td>
</tr>
<tr>
<td>JIS Flange</td>
<td>25A~65A</td>
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Fitting Options

IDF/ISO clamp union (ferrule)  JIS Flange

The unit must not be mounted vertically as shown, as steady flow may not reach the prism.