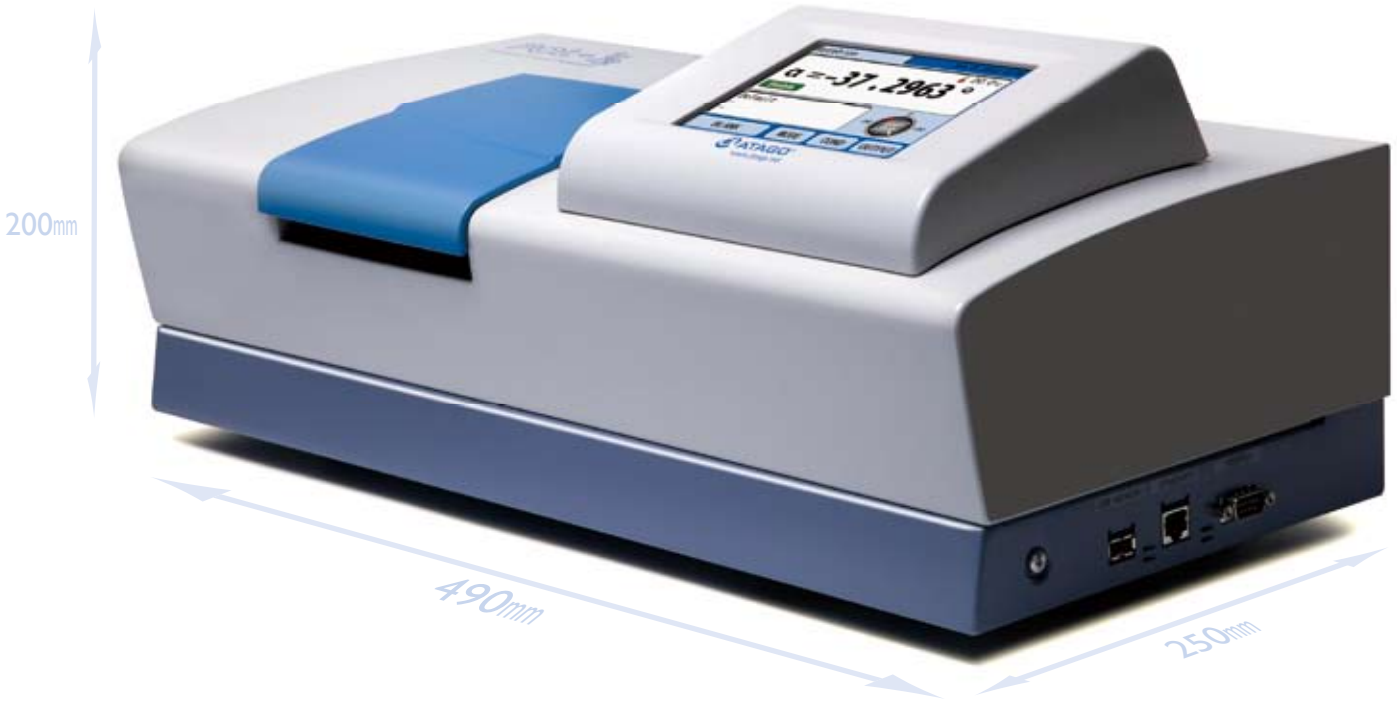
ATAGO®

POL-1/2

Automatic Compact Polarimeter

Powerful Performance
Comes in Small Packages

Compact



Overview

ATAGO's new polarimeter offers robust performance and ultimate efficiency in small footprint.

Thanks to improvements made in structural design,
the POL-½ needs only half the space of a conventional model.
The space-saving design promotes installation flexibility.
A lightning-fast response time of 60° per second optimizes operational efficiency.

● Looks can be deceiving.
Though it is half the size of a traditional polarimeter, the POL- ½ provides better resolution than most.

● There is no time to waste.
The response time is 60° per second. That is 15 times faster than before.

● It cannot be easier.
The LCD touchscreen color display makes all operations fast and easy.
Data transfer is simple with the use of a USB flash drive.
The sample temperature is measured directly and accurately.

● Always aim high.
With new optical technology, the world's highest class resolution of 1/10000° has been achieved.

● Get validated. Stay compliant.
We provide Installation Operational Performance Qualification (IQ/OQ) documentation and support to ensure compliance with all appropriate regulations.

Concept

With a 100mm cell, measure at an accuracy of ±0.002°* and resolution of 0.0001°.

* Less than 1°angle of rotation

Compliance with pharmacopeias and other regulatory requirements worldwide is within easy grasp.

● Applicable industries

- **Pharmaceutical** — Various medications and vitamins
- **Personal Care** — Cosmetics, Essential oils, Fragrances
- **Sugar** — Various sugars
- **Food** — Dairy products, Sugars, Amino acids
- **Academic Research** — Polymers, Proteins, Polysaccharides, Organic compounds

Powerful Performance Comes in Small Packages

POL-½
Automatic Compact Polarimeter

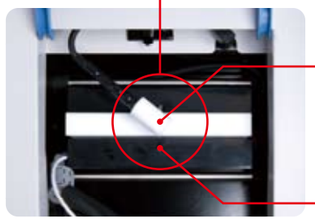
POL-½ Cat.No.5271

Temperature Control

The optional Peltier temperature control unit delivers perfectly temperature-controlled measurements.

This Peltier temperature control unit does not require the use of water.
Enjoy stress-free temperature control without worrying about a water leak or cleaning.

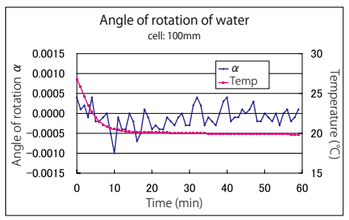
POL-½ with Peltier temperature control Cat.No.5272



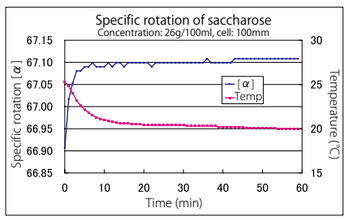
Temperature sensor for sample (standard accessory)
Choose either the temperature of the cell holder or the temperature of the sample liquid itself to be measured.

Advantage of using a square cell
The thermostat is in contact with the bottom and both sides of the cell, enabling quick and accurate temperature control.

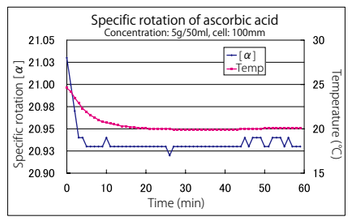
Measurement results when using a Peltier temperature control unit
– The closer the sample temperature is to the target temperature, the more quickly the stability is obtained.



Water



Saccharose (surcorse)



Ascorbic acid

Mechanism

The hollow-shaft motor delivers industry's fastest measurement.

The hollow-shaft motor turns the analyzer directly.
Measure at 60° per second, the best response speed in its class.

LED light source *Only 589nm is available.

Compared to the conventional halogen lamp, LED is quieter and has a longer lifespan. LED saves time and cost in maintenance.
Although the use of LED as a light source is not explicitly listed in traditional pharmacopeias, it is regarded as compliant in a practical sense for the following 2 reasons: 1) the wavelength produced via the filter is 589nm, and 2) the measurement results obtained with the use of a LED light source agree with the results obtained with other measuring devices listed in pharmacopeias.

Hollow-shaft motor

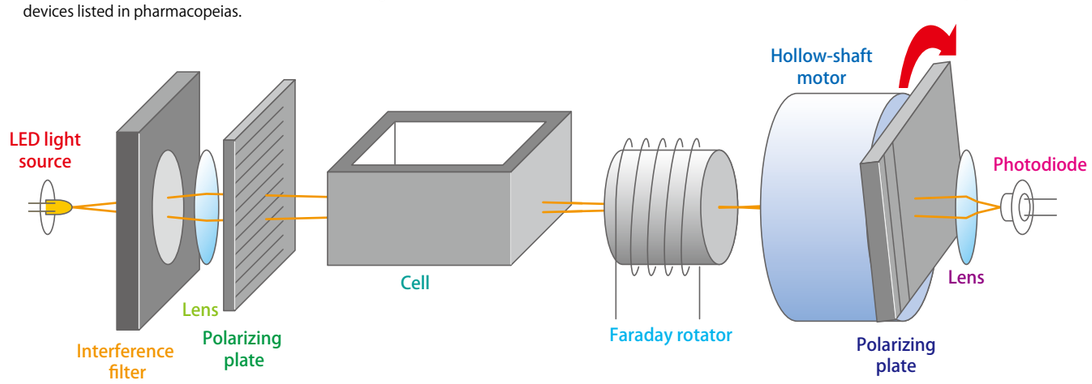
The motor turns the analyzer directly. This simplified structure allows for the remarkable improvements in both response time and accuracy.

The resolution of the motor is 0.00045°. By taking its moving average, the resolution of the angle of rotation (0.0001°) is calculated.

The angle of rotation data are taken every 0.1 second. Each measurement of angle of rotation is calculated from up to 5 moving averages with the maximum response time of 0.5 second.

Photodiode

Stable measurements are guaranteed for an incident light of up to 10%.

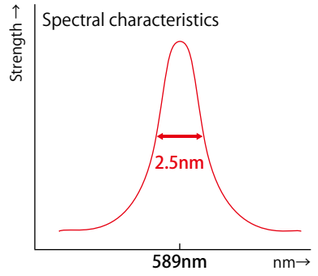


Polarizing plate

A polarizer with a high extinction ratio is used.

Interference filter

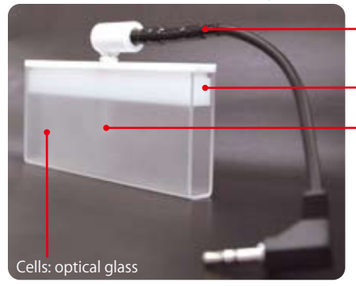
A high performance filter with a FWHM of 2.5nm is used.



Cell

In addition to the standard square shape, cylindrical cells are also available upon request. Choose from 10mm, 20mm, 50mm, or 100mm. The exact cell length is entered in the unit for measurement. *The exact optical path length cannot be entered in the unit.
The volume capacity of a standard cell with an optical path length of 100mm is approximately 12ml. The smallest cell is 10mm in optical path length and 0.1ml in volume. Cells are available in various volume capacities of 0.1 to 30ml to meet many different application needs.

100mm square cell (standard accessory)



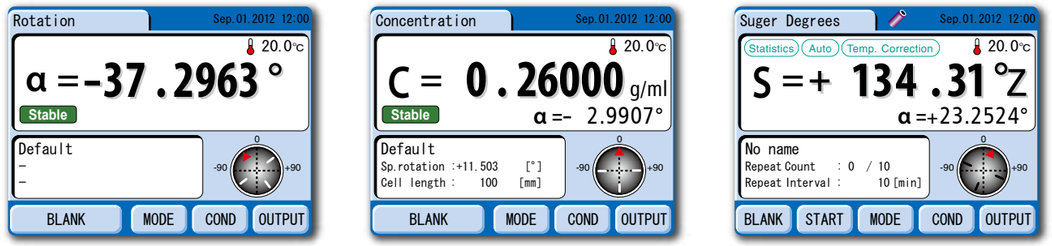
Temperature sensor for sample (standard accessory)
Lid: PTFE
Temperature sensor: PFA
The sensor probe is directly submerged in the sample liquid for optimal accuracy.

Function

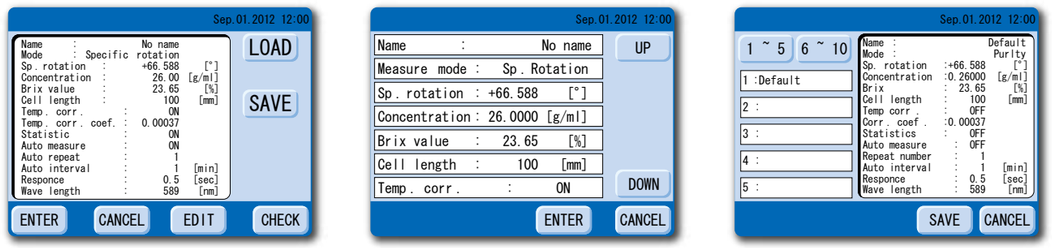
The color LCD touchscreen delivers quick and smooth operations.

With the intuitive user interface, it is extremely easy to view measurement results and adjust settings.

● Measurement result screens



● Settings and data input screens



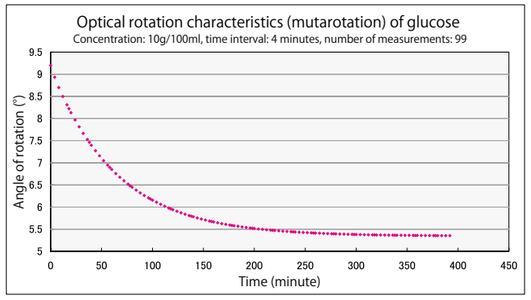
•Example of continuous measurement settings

(mutarotation of glucose)

Examples of setting items

Auto measure : ON
Repeat number : 99
Auto interval : 4
Response : 5 (default)

Mutarotation of a substance can be measured by setting the number of measurements and time interval between measurements in the continuous measurement mode.



•Data storage

The graph on the left was created in Excel from the text file of the measurement results transferred to a PC via a USB flash drive.

•Protection of settings

Up to 10 sets of settings can be stored and protected with passwords.

● Data storage and export

Angle of rotation, specific rotation, concentration, International Sugar Scale readings as well as statistical computation results can be exported. Measurement results can be either saved as a text file to a USB flash drive or printed to a printer (sold separately).
USB flash drive (1GB/FAT16) is standard accessory.

```
ATAGO POL-1/2
2012 09/01 12:00
NAME : Test_Sample_01
LAMP : 589 [nm]
CELL LENGTH : 100 [mm]
-----------------------
ROTATION α
    = +10.0193    [°]
TEMP  =    16.4   [°C]
```

Angle of rotation

```
ATAGO POL-1/2
2012 09/01 12:00
NAME : Test_Sample_01
LAMP : 589 [nm]
CONCENTRATION
     :  0.26000[g/ml]
CELL LENGTH : 100 [mm]
-----------------------
SPECIFIC ROTATION [α]
    = +38.533     [°]
ROTATION α
    = +10.0186    [°]
TEMP  =    16.4   [°C]
```

Specific rotation

```
ATAGO POL-1/2
2012 09/01 12:00
NAME : Test_Sample_01
LAMP : 589 [nm]
CONCENTRATION
     :  0.26000[g/ml]
CELL LENGTH : 100 [mm]
TEMP CORR. COEF.
     :  0.00037
-----------------------
SPECIFIC ROTATION [α]
    = +38.484     [°]
ROTATION α
    = +10.0191    [°]
TEMP  =    16.4   [°C]
```

Specific rotation
(temperature compensated)

```
ATAGO POL-1/2
2012 09/01 12:00
NAME : Test_Sample_01
LAMP : 589 [nm]
CONCENTRATION
     :  0.26000[g/ml]
CELL LENGTH : 100 [mm]
-----------------------
SPECIFIC ROTATION[α](°)
COUNT      DATA     TEMP
    1   +38.532     16.3
    2   +38.530     16.3
    3   +38.531     16.3
    4   +38.532     16.3
    5   +38.530     16.3
    6   +38.532     16.3
-----------------------
MEAN  =   +38.531    [°]
σ(n-1)=    0.0010    [°]
C.V.  =    0.0026    [%]
```

Average & standard deviation

```
ATAGO POL-1/2
2012 09/01 12:00
NAME : Test_Sample_01
LAMP : 589 [nm]
CONCENTRATION
     :  0.26000[g/ml]
CELL LENGTH : 100 [mm]
-----------------------
SPECIFIC ROTATION[α](°)
COUNT      DATA     TEMP
    1   +38.530     16.3
    2   +38.528     16.3
    3   +38.528     16.3
    4   +38.528     16.3
    5   +38.528     16.3
    6   +38.526     16.3
    7   +38.530     16.3
    8   +38.528     16.3
    9   +38.528     16.3
   10   +38.527     16.3
-----------------------
MEAN  =   +38.528    [°]
σ(n-1)=    0.0012    [°]
C.V.  =    0.0031    [%]
```

Statistical computation results
(up to 10 measurements)

Accessories

A wide variety of cell options, printer deliver optimized measurement and data processing solutions.

● Cells

Part No.	Product Name	Detail
RE-86010	Square type cell holder	For square cell, without cell lid, applicable for circulated water at constant temperature (same as standard supplied holder)
RE-82100	Square cell 100	Optical path length 100 mm, sample amount 12 mL, without cell lid (spare)
RE-82101	Square cell 50	Optical path length 50 mm, sample amount 6 mL, without cell lid
RE-82102	Square cell 20	Optical path length 20 mm, sample amount 2.4 mL, without cell lid
RE-82103	Square cell 10	Optical path length 10 mm, sample amount 1.2 mL, without cell lid
RE-88100	Square cell lid 100	For square cell 100, made of fluorine resin, with a hole for temp sensor probe
RE-88101	Square cell lid 50	For square cell 50, made of fluorine resin, with a hole for temp sensor probe
RE-88102	Square cell lid 20	For square cell 20, made of fluorine resin, with a hole for temp sensor probe
RE-88103	Square cell lid 10	For square cell 10, made of fluorine resin, with a hole for temp sensor probe
RE-88200	Plug for cell lid, 2pcs	For cylindrical and square cells, spare
RE-89100	Temperature sensor for sample	For sample temperature measurement, standard accessory (spare)
RE-87000	Cell holding parts	For sample temperature measurement, using 10 mm / 20 mm square cell
RE-82104	Square micro cell 100	Optical path length 100mm, sample amount 2mL, cell lid included, the aperture for square micro cell required
RE-82105	Square micro cell 50	Optical path length 50mm, sample amount 1mL, cell lid included, the aperture for square micro cell required
RE-86103	Aperture	For square micro cell
RE-86011	V-type cell holder	For cylindrical and jacket cells
RE-88014	Cylindrical cell 100	Optical path length 100mm, sample amount 29.8mL, without cell lid, V-type cell holder required
RE-88015	Cylindrical cell 50	Optical path length 50mm, sample amount 14.9mL, without cell lid, V-type cell holder required
RE-88016	Cylindrical cell 20	Optical path length 20mm, sample amount 6.0mL, without cell lid, V-type cell holder required
RE-88017	Cylindrical cell 10	Optical path length 10mm, sample amount 3.0mL, without cell lid, V-type cell holder required
RE-88108	Round cell lid	For cylindrical, jacket, and square micro cells, made of fluorine resin, with a hole for temperature sensor probe
RE-82106	Jacket cell A1	Optical path length 100mm, sample amount 6.4mL, V-type cell holder required
RE-82107	Jacket cell A3	Optical path length 20mm, sample amount 1.3mL, V-type cell holder required
RE-82108	Jacket cell B1	Optical path length 100mm, sample amount 2mL, V-type cell holder required
RE-82109	Jacket cell C1	Optical path length 100mm, sample amount 1mL, V-type cell holder required
RE-82110	Jacket cell C2	Optical path length 50mm, sample amount 0.5mL, V-type cell holder required
RE-82111	Jacket cell C3	Optical path length 20mm, sample amount 0.2mL, V-type cell holder required
RE-82112	Jacket cell C4	Optical path length 10mm, sample amount 0.1mL, V-type cell holder required
Cat.No.3133	DP-AD24	Plain paper printer - Connection cable included (0.75m)
RE-89403	Standard roll paper	4 rolls in a set
RE-89402	Ink ribbon for standard paper printer	1 piece
RE-86012	TCS-1	Peltier temperature control unit
Cat.No.1922	60-C4	Circulating constant temperature bath (4L / min)

● DP-AD24 dot matrix printer

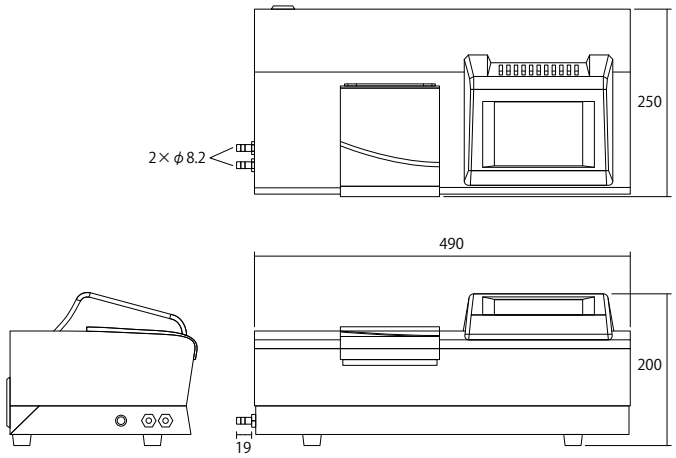
Prints out measurement data. Data can be exported to either this printer or a USB flash drive.

* Connection of circulating constant temperature water bath
The circulation flow should be set to 12 L / min as a guide, and the maximum head pressure should not exceed 5 m. Prepare rubber piping with 11 mm O.D. / 7 mm I.D.

Specifications

Polarimeter

Dimensions

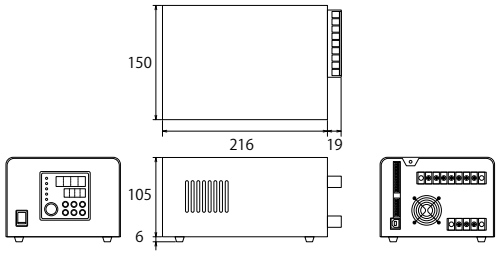


Technical specifications

Light source	LED
Polarizer	Polarizing film
Wavelength	589nm
Detector	Photodiode
Observation tube length	Up to 100mm
Measurement range	±90° angle of rotation
Accuracy	±0.002° of displayed value (less than 1°), relative precision of ±0.2% (greater than or equal to 1°)
Repeatability	±0.002°
Resolution	0.0001°
Response time	60°/second max.
Measuring principle	Symmetric angle oscillation optical null method
Thermometer location	At the cell holder or inside the cell
Temperature range	0.0 to 99.9℃
Display	5.7-inch color LCD
Input method	Touchscreen
Measurement item	Angle of rotation, specific rotation, International Sugar Scale, concentration, purity
Data processing	Continuous measurement, statistical computation
Data storage	Printer (sold separately), USB flash drive
Network connection	Ethernet
Power supply	AC100V to AC240V, (50/60Hz)
Power consumption	100VA
Dimensions	490 (W) x 250 (D) x 200 (H) mm
Weight	13kg

Peltier temperature control unit

Dimensions



Technical specifications

Temperature control method	Auto-tuning PID temperature controller
Temperature range	15℃ to 35℃
Control accuracy	±0.1℃ (resistance thermometer)
Display accuracy	0.1℃
Resolution	0.1℃
Ambient temperature range	0 to 40℃
Ambient humidity range	Less than 90% RH, no condensation
Safety features	Fuse (interrupts excessive current), buzzer alarm
Power supply	AC100V to AC240V, (50/60Hz)
Power consumption	150VA
Dimensions*	150 (W) x 216 (D) x 105 (H) mm
Weight	Approx. 2.5kg

* Rubber feet, terminal blocks, and any other protuberances are excluded.

All ATAGO polarimeters are designed and manufactured in Japan.

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

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 FAX : 81-3-3431-1945
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 : 91-22-2833-8038 / 8076 customerservice@atago-india.com

ATAGO (THAILAND) Co.,Ltd.
TEL : 662-982-8718-9 customerservice@atago-thailand.com

ATAGO BRASIL Ltda.
TEL : 55 16 3916-6000 customerservice@atago-brasil.com

ATAGO ITALIA s.r.l.
TEL : 39 2 36557267 customerservice@atago-italia.com

ATAGO CHINA Guangzhou Co.,Ltd.
TEL : 86 20-38106065 info@atago-china.com

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※Specifications and appearance are subject to change without notice.

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