

*For The Most Demanding
High Accuracy Applications*

The Autopol[®] VI Automatic Polarimeter



United States of America
National Institute of Standards and Technology



NVLAP LAB CODE: 200898-0
Accreditation to ISO/IEC 17025:2005



The brand of polarimeter used in more U.S. labs than any other.*

*Emmes Survey

AUTOPOL® VI

The Autopol® VI Automatic Polarimeter was developed for the most demanding analytical laboratories. If you are a high performance lab, the Autopol® VI has the features you must have.

Standard Features And Accessories

- 0.0003 accuracy for low rotation samples of $\pm 1^\circ$ Arc
- TempTrol™ – Electronic cooling & heating from 15°-35°C
- Six Standard Wavelengths: 365nm, 405nm, 436nm, 546nm, 589nm and 633nm
- 21CFR11 Compliance: Electronic Signature and secure local electronic data storage
- Domestic 3-year warranty and 20-year support guarantee
- Standard Accessories: TempTrol™ NIST Traceable Quartz Standard, TempTrol™ 100mm Polarimeter Cell, TempTrol™ Temperature Validation Cell, Built-In Sample Measurement Probe, 3 USB ports



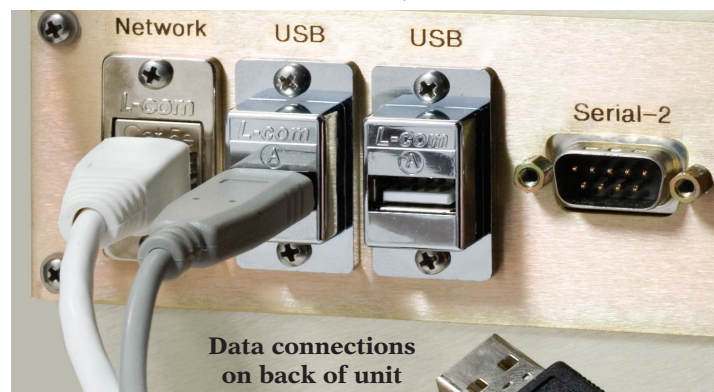
Versatile Communication Capability

The Autopol® VI's standard communication package includes:

- Ethernet Port for Network Cable Connection
- 3 USB ports
- 2 RS 232 ports

Allowing the capability to:

- Connect directly to Rudolph's service department for remote testing and diagnostics via Internet connection.
- Connect to any Windows® based printer via USB or direct to the server via Windows® Print Library
- Save measurement data direct to your Network/Server



TempTrol™ Electronic Temperature Control System

The USP <781> requires optical rotation measurements at $25^\circ\text{C} \pm .5^\circ\text{C}$ (unless another temperature is specified). The European Pharmacopoeia requires optical rotation measurements made at $20^\circ \pm .5^\circ\text{C}$ (unless another temperature is specified).

Whatever your temperature control needs are, the Autopol® VI's **exclusive TempTrol™ System (Patent No. 2778542)** makes your measurement in seconds without a waterbath or any type of water circulation.

The TempTrol™ System allows push-button temperature control of your 100mm cell, 200mm cell or Quartz Plate. Set the temperature, push "measure" and walk away. The Autopol® VI will heat or cool to a predefined temperature and then provide you with the result all in one easy step.

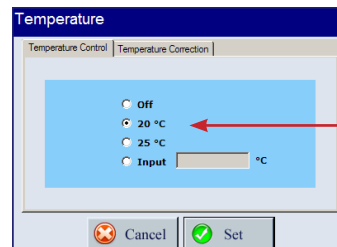
Patented TempTrol™ Technology Eliminates the Need for a Water Bath. Here is How the TempTrol System Works:



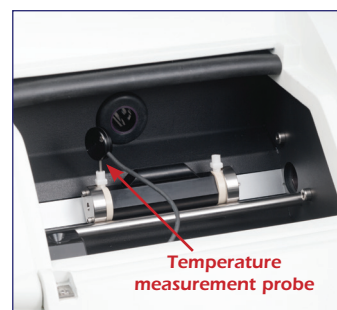
TempTrol heating and cooling transfer surface



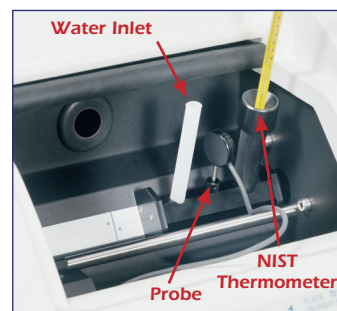
TempTrol cell with mating heating & cooling transfer surface manufactured with acid resistance materials: Hastelloy™ and Peek™.



Temperature is selected via touch screen. Temperature selection of 20°C shown left.



Place the TempTrol cell in your TempTrol equipped Autopol® sample chamber to measure to within $\pm 0.2^\circ\text{C}$ of the USP, EP, JP or BP specified temperature (normally 20°C or $25^\circ\text{C} \pm 0.5^\circ\text{C}$)



Rudolph provides a temperature validation cell with every TempTrol system. The temperature validation cell along with an optional NIST traceable thermometer is designed to validate the temperature control performance of the polarimeter and cell to $\pm 0.2^\circ\text{C}$.

Full cGMP/GLP Compliance

Setup

Temp Stability | Measurement Mode | Methods | Operational Param | Instrument Calibration | Service

QCP Calibration | QCP Coefficients | Temperature Calibration | Change Password

Uncal: -0.007 Cal: -0.007

Wavelength: 589

Cal Mode: Enable

Coef.: 1.000000

Quartz Plate: 31.2099 Arc 20 C

Temp. Mode: Probe

Temp.: 20.0 C

Temperature Correction is on.

Measure/Calibrate Zero

OK Cancel Apply

You are in Setup->Instrument Calibration->QCP Calibration

Validation and Calibration

Rudolph Research Analytical knows that you must be able to validate your instrument's operating performance regularly. Therefore, the Autopol® VI comes standard with the accessories, validation tools and automatic calibration functions necessary to ensure that the temperature control, temperature measurement and optical measurement processes are working accurately and reproducibly. All functions are accessed simply and conveniently through the Autopol® VI liquid sealed touchscreen.

Just listen to our customers

"We have the AUTOPOL V from Rudolph Research Analytical (RRA)... I have used numerous polarimeters and this is by far the best. We have had it for 1-1/2 years and have had zero problems, the original lamp is still in the instrument. I recommend it over other instruments. RRA installed, trained and performed the IQOQ... It is one piece of equipment that you never worry about."

Alan Davis – Rockwell Medical Technologies

cGMP/GLP Printing

Measurement reports can be saved as an Excel or PDF file and edited quickly and easily. You can import logos and print your company's customized "C of A" directly.

Microsoft Excel - 20090127163648.xls

File Edit Format Tools Data Window Contribute Help Ruance PDF

Open In Contribute Publish To Website Post To Blog

J31

A	B	C	D	E	F	G	H	I	J	K	L
1	Rudolph Research Analytical										
2	Tuesday, January 27, 2009										
3											
4	This sample was measured on an Autopol VI serial number 80179, manufactured by Rudolph Research Analytical, Hackettstown, NJ.										
5											
6											
7	Set Temperature : 20.0										
8	Temp Corr : OFF										
9											
10	n	Average	Std.Dev.	Maximum	Minimum						
11	5	34.467	0.0000	34.467	34.467						
12											
13	S.No	Time	Result	Scale	OR *Arc	WLG	Lg.mm	Temp.	Comment		
14	1	4:32:05 PM	34.467	OR	34.467	589	100.00	20.0			
15	2	4:32:08 PM	34.467	OR	34.467	589	100.00	20.0			
16	3	4:32:10 PM	34.467	OR	34.467	589	100.00	20.0			
17	4	4:32:13 PM	34.467	OR	34.467	589	100.00	20.0			
18	5	4:32:16 PM	34.467	OR	34.467	589	100.00	20.0			
19											
20											
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23											
24											
25											
26											
27											
28											

Sheet1

Ready

Print your customized Certificate of Analysis including your company logo directly from the Autopol VI® touch screen

Adobe Reader

File Edit View Window Help

72.5%

Find

Rudolph Research Analytical

Tuesday, January 27, 2009

This sample was measured on an Autopol VI, serial number 80179, manufactured by Rudolph Research Analytical, Hackettstown, NJ.

Set Temperature : 20.0

Temp Corr : OFF

n	Average	Std.Dev.	Maximum	Minimum
5	34.467	0.0000	34.467	34.467

S.No	Time	Result	Scale	OR *Arc	WLG	Lg.mm	Temp.	Comment
1	4:32:05 PM	34.467	OR	34.467	589	100.00	20.0	
2	4:32:08 PM	34.467	OR	34.467	589	100.00	20.0	
3	4:32:10 PM	34.467	OR	34.467	589	100.00	20.0	
4	4:32:13 PM	34.467	OR	34.467	589	100.00	20.0	
5	4:32:16 PM	34.467	OR	34.467	589	100.00	20.0	

Capable of making multiple measurements on a single sample and reporting complete statistical data and all measurement results

Rudolph's Most Advanced Polarimeter

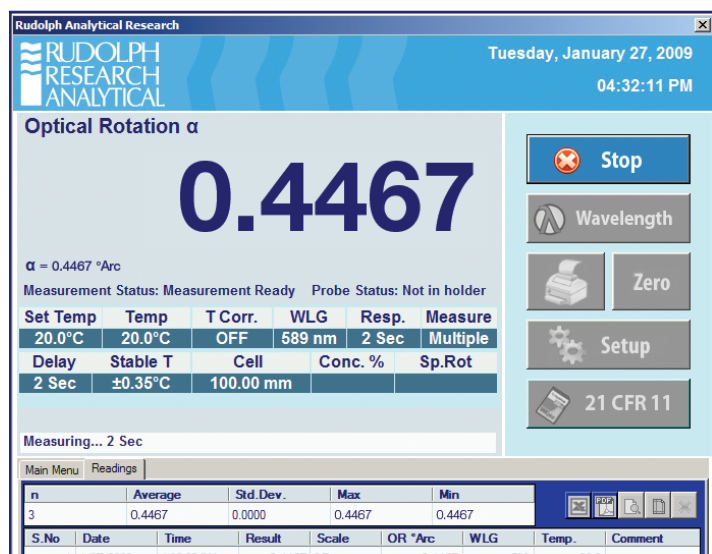
Offering 0.0003 Accuracy & Interface Flexibility



The Autopol VI comes standard with Hastelloy™ acid resistance

Unmatched Accuracy

For Racemic Solutions and very low concentration samples, the Autopol® VI provides unmatched 4th decimal optical rotation accuracy of $\pm 0.0003^\circ \text{Arc}$ over $\pm 1^\circ \text{Arc}$. Instrument performance for readings between -1 and 1°Arc is: Resolution ± 0.0001 , Reproducibility ± 0.0002 , and Accuracy ± 0.0003 .



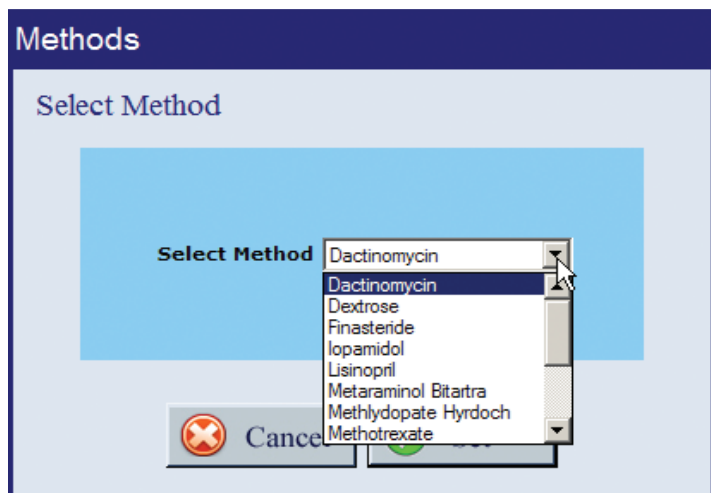
Intuitive Windows® Based Interface

- 2 gigabytes of internal memory allow almost unlimited capacity for saving measurement data. The Autopol® VI is network ready and data may also be saved directly to your server or to any directory desired.
- Internet access is possible directly from the Autopol® VI's touch screen. This feature allows real time contact with Rudolph Research Analytical's Service and Technical Support Team who can access your instrument remotely to assist in Window navigation, method setup and trouble shooting.
- Windows based navigation architecture is so intuitive that most operators will never read the manual. But should you wish to reference the manual, it is stored right on the Autopol® VI's internal memory.
- Three USB ports allow quick and easy connection to a mouse, keyboard, printer, bar code scanner, or memory stick. One USB port is located on the front of the unit (shown below) and two USB ports are located on the back of the unit (shown left).



Flexible Method Management

Install your own measurement methods for immediate selection of the correct method to match your most common tests. Setting up your custom method is as simple as filling out a few screens like the one shown to the right.



Method Setup

Time Delay | Temp Stability | Measurement Mode | **Methods** | Operational Param | Instrument Calibra

Method Name Metyrosine **Cell Length** 50.00 mm

Zero/Rotation Offset 0.000 **Temp Control** On

Wavelength 546 nm **Set Temp** 30.0 C

Mode Sp. Rot. **Temp Correct** Off

Specific Rotation **Response Time** 2 Sec

Prompt for Concentration ☒ **Statistics** On (n-1)

Concentration 26.123 % **Range Check** On

Prompt for Multiplier ☒ **Range High** 195.000

Multiplier **Range Low** 185.000

+ Add Edit Apply Cancel

OK Cancel Apply

You are in Setup->Methods

Full 21CFR Part 11 Instrument Level Compliance

The Autopol® VI's 21CFR Part 11 software module is easily enabled through the user friendly touch screen. This module gives you full compliance with:

- Electronic signature
- Access levels
- Internal write protected storage
- Unique passwords
- Write protected documents sent directly to server
- Audit trail

Audit Trail

User Name	User Level	Tab Name	Changes
jsmith	Operator,Reviewer	Temperature Cali...	Temperature calibration was...
jsmith	Operator,Reviewer	Temperature Cali...	Temperature calibration was...
Administrator	Admin	Edit Account	For jsmith account,Passwor...
Administrator	Admin	Add Account	jane.doe account was added
Administrator	Admin	Add Account	jdoo account was added
Administrator	Admin	File Export Option	Path was changed
Administrator	Admin	File Export Option	File Export Format was chan...
Administrator	Admin	File Export Option	File Export Format was chan...
Administrator	Admin	Set 21CFR11	Enable Review was changed
Administrator	Admin	Methods	Sucrose method was added
Administrator	Admin	Add Account	japublic account was added
Administrator	Admin	Terminology	AccetTerminology was cha...
Administrator	Admin	Terminology	RejectTerminology was cha...
Administrator	Admin	Terminology	RejectTerminology was cha...
Administrator	Admin	Terminology	AccetTerminology was cha...
Administrator	Admin	Password Settings	Login Attempts was changed
Administrator	Admin	Password Settings	Expiration was changed
Administrator	Admin	Password Settings	Minimum Length was chang...
Administrator	Admin	Password Settings	Expiration was changed
Administrator	Admin	Password Settings	Minimum Length was chang...
Administrator	Admin	Password Settings	Login Attempts was changed
Administrator	Admin	Add Account	jsmith account was added
Administrator	Admin	Set 21CFR11	Enable Review was changed

View All Search Print Close

21 CFR Part 11

Set 21CFR11 | Add Account | Edit Account | Password Settings | Terminology

Password Settings

Minimum Length 8

Expiration 90 (1-9999, 0-Disable)

Login Attempts 3 (1-99, 0-Disable)

Uniqueness ☐

OK Cancel Apply

21 CFR Part 11

Set 21CFR11 | Add Account | Edit Account | Password Settings | Terminology

New Account

Name jsmith

Password *****

Retype Password *****

Access Level

☒ Operator

☒ Reviewer

☐ Administrator

+ Add

OK Cancel Apply

21 CFR Part 11

Password Settings | Terminology | File Export Option | **Audit Trail**

To view 21CFR11 audit information, click here.

Audit Trail

OK Cancel Apply

21 CFR Part 11

Set 21CFR11 | Add Account | Edit Account | Password Settings | Terminology

Edit Account

Select Account Administrator

Administrator

reviewer

operator

jsmith

Edit Delete

OK Cancel Apply



Today our Service Technicians have access to state of the art diagnostic tools and have a depth of knowledge that often lets them solve problems right over the phone. Our customers really appreciate the same day phone call by a real technical service person who wants to solve their problem. Our customers also know that they can expect this support for many years to come as Rudolph is still repairing instruments which were built in the 70's.

Contact us! A customer service representative is waiting to serve you!

Phone: 973-584-1558

E-mail: service@rudolphresearch.com

Fax: 973-584-5440

Specifications of the AUTOPOL® VI

Measuring Mode: Optical Rotation, Specific Rotation, Concentration & User-defined Scales

Measuring Scale: Degrees Arc, % Concentration

Measuring Range: $\pm 89^\circ$ Arc Optical Rotation,
 $\pm 999.99^\circ$ Arc Specific Rotation and
0-99.9% Concentration

Performance between -1° Arc and $+1^\circ$ Arc

Resolution: 0.0001° Arc Optical Rotation
0.0001% Concentration
0.0001° Specific Rotation

Reproducibility: 0.0002° Arc Optical Rotation

Accuracy: 0.0003° Arc Optical Rotation

Wavelengths: 589 nm

Performance outside of $\pm 1^\circ$ Arc

Resolution: 0.001° Arc Optical Rotation
0.001% Concentration
0.001° Specific Rotation

Reproducibility: 0.002° Arc Optical Rotation

Accuracy: 0.002° up to 1° , 0.2% from 1° to 5° ,
0.01° above 5°

Wavelengths: 365nm, 405nm, 436nm, 546nm,
589nm, 633nm

Prism: Glan Thompson calcite quartz

Optical Wavelengths: 365nm, 405nm, 436nm, 546nm,
589nm, 633nm (other wavelengths
available)

Wavelength Selection: Automatic by push-button

TempTrol™ Range: Automatic Electronic Heating & Cooling 15° - 35°C

TempTrol™ Accuracy: $\pm 0.2^\circ\text{C}$

Temp. Probe Range: 10° - 40°C

Temp. Probe Accuracy: $\pm 0.1^\circ\text{C}$

Acid Resistance: Hastelloy™ measurement cell and
Silco Steel™ sample chamber

Measurement Time: 4°/sec. slew rate and 5 sec. nominal
settling time

Light Source: Tungsten-halogen 6V, 20W,
avg. 2,000 hour life

Sample Chamber: Accepts sample tubes up to 200mm

Display: 10.4 inch diagonal, 800-600 pixels,
color, Flat Panel Monitor with
Resistant Touch Screen Interface,
200 nits brightness, gasketed for
spill protection

Communication Interface: Touch Screen User Interface
3 – USB Ports
2 – RS232 Ports
Ethernet Port for Network
Connection
Keyboard, Bar Code Scanner,
Mouse, Network Capabilities

Internal Memory: 2 GB Non-removable Compact Flash

Shipping Dimensions: 36 in. (L) x 19 in. (W) x 18 in. (H)
91.44 cm (L) x 48.26 cm (W) x 45.72
cm (H)

Shipping Weight: 105 lbs. (31.75 kg)

Power Supply: 85 to 260 VAC; 48 to 62 Hz

Power Consumption: 150 – 200 Watts