Digital Refractometers & Polarimeters

FOR PRECISE MEASUREMENT OF CONCENTRATION AND PURITY

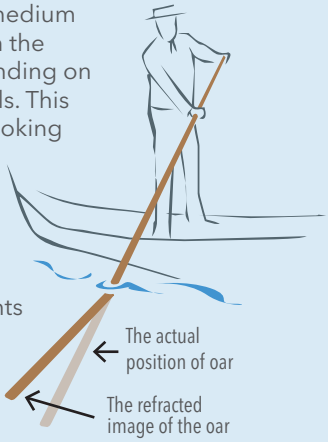
Bellingham + Stanley

a xylem brand

Precision measurement of concentration and purity in laboratory or factory environments

What is Refractive Index?

When light passes from one medium to another, the speed at which the light travels will change depending on the parameters of the materials. This principle can be seen when looking at a straw in a glass or an oarsman on the river, as shown in the diagram.



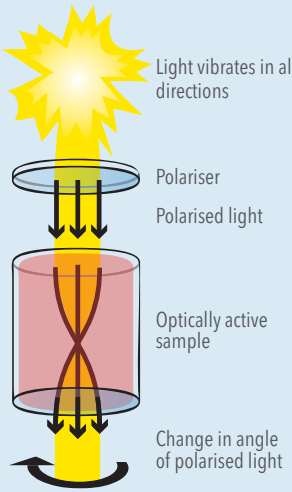
The ratio or change in the speed of light is called refractive index and instruments that measure this are called refractometers.

The refractive index of a liquid is related to its concentration and so a refractometer can display the concentration in suitable units, such as °Brix (sucrose), glucose, sodium chloride, urea and urine specific gravity to name just a few.

What is Optical Rotation?

When plane-polarised light passes through an optically active substance, the plane of polarisation will rotate by an amount that is specifically related to the product through which it travelled.

As many chemical compounds display this chiral characteristic, the measurement of optical rotation using a polarimeter is commonplace within the sugar, food, chemical and pharmaceutical manufacturing industries as a production control and quality assurance tool.



Feature Key

- NEW
- 21 CFR 11 — 21 CFR Part 11
- Peltier Temperature Control
- RFID User Identity
- Factory Friendly
- USB Connectivity
- HD — HD Colour Display

UK MADE

All instruments shown in this brochure are made in the UK, except ADP600 series, made in USA.

RFM700 Refractometers

RFM700 series refractometers are robust, low cost, fully automatic instruments that are ideally suited to the food, sugar and beverage industries but can also be used in many other non-food applications where temperature control is not required.

Commonly, the RFM700-M series refractometers are supplied to operate in the °Brix scale with results temperature compensated to 20°C in accordance with ICUMSA. Additional user scales provide measurement in different formats such as Refractive Index (RI) various wine, urine specific gravity & automotive scales as well as allowing custom scales to be loaded in accordance with product data.

Inherent to the robust design is a sapphire prism mounted in an easy-clean stainless steel dish and an outer casing that is sealed and shaped to withstand sample spillage and moisture ingress. This, together with the external power supply and bright 4" high definition full colour display, makes the RFM700-M ideal for use in busy laboratories or harsh factory environments. The instrument can also save and/or print results and be connected to a printer or laboratory PC, with results being output in standard print, CSV or secure PDF formats.

Other software features include special AG temperature compensation that facilitates a SPAN calibration when using AG calibration fluids, and a time delay before reading, ensuring reliable results every time.

- Classic red or modern colour display
- Multiple scale
- Alphanumeric keypad
- Audit trail (date, time, batch & operator)
- USB connectivity

Specifications	RFM712-M (71F)	RFM732-M (73F)	RFM742-M (74F)
Order Code	19-00	19-10	19-20
Scales			
°Brix	0 – 50	0 – 100	0 – 100
User Defined (RI equivalent)	100 (1.33-1.42)	100 (1.33-1.54)	100 (1.33-1.54)
Resolution (°Brix/RI equivalent)	0.1 (0.0001)	0.1 (0.0001)	0.01 (0.00001)
Accuracy (°Brix/RI equivalent)	±0.1 (±0.0001)	±0.1 (±0.0001)	±0.04 (±0.00005)
Precision (Reproducibility)			
Refractive Index	± 0.00005	± 0.00005	± 0.00001
Sugar (°Brix)	± 0.05	± 0.05	± 0.01
Other Scales	20+ pre-programmed scales including HFCS (3), Sugar (4), Honey, NaCl, Wine Must (5), Urine SG (3), Glycol (2), Urea, FSII and more; plus customer programmable user scales via PC.		
Temperature Range	5-40°C		
Temperature Compensation	ICUMSA, AG, None or User Defined		
Temperature Control	None – Temperature Compensation (ATC)		
Temperature Sensor Accuracy	±0.05°C		
Temperature Stability Checks	Delay time (programmable in seconds)		
Interface	1 x USB (A), 1 x USB (B) - Ethernet & Serial (RS232) via optional adaptor		

RFM300 Refractometers

The RFM300 Series of refractometers are the result of a combination of over 100 years' experience in design and manufacturing led by customer needs. With a wide measuring range and Peltier temperature control of the flat, easy clean prism, the RFM300 Series refractometers offer extremely rapid temperature stabilization of the sample, allowing readings to be taken quickly and reliably in any scale including Brix, Refractive Index (RI) or up to 100 user defined scales.

Whether a high resolution 7" touchscreen (RFM300-T) or a more tactile keypad (RFM300-M) is required, the graphical user interface with easy to use menus gives the RFM300 Series instruments a fresh, modern look and feel.

A large sampling area on the prism surface allows measurement of not only homogenous fluids like juices, sodas, sauces and edible oils, but also difficult to read samples like fruit pulps and industrial resins.

Intelligent software ensures rapid temperature response to changes in prism temperature, whilst the SMART temperature stability check makes sure that the result is displayed only when the sample is stable. A Methods system allows rapid configuration of instrument setup and provides limit checks against stored data as well as product-specific corrections, such as citric acid content for orange juice or coffee solids daily offsets. Over 8000 readings may be stored within the instrument memory and the on-screen menu may be displayed in a number of different languages.

The instrument is available in two formats, the most popular being the 3-decimal place Brix RFM340 refractometer, which, following improvements to the thermodynamic control system, now has an increased measurement performance between 0-30 °Brix and so reduces potential measurement error in the critical range covering finished products like the aforementioned juices and sodas. By improving the performance at the low end of the scale, users may now trim syrup dilution to the absolute minimum without the risk of breaching manufacturing specifications.

SG scales for sucrose are also common to the series. These scales may be used to express the relative density of pure sucrose solutions and, when used in conjunction with a product

offset from within the Methods system, can express finished beverages as an equivalent SG. By doing so, contract packers of beverage products may now use a refractometer in situations where density °Brix or SG is dictated as the method of analysis, whilst retaining all the measurement advantages held by a refractometer. A dual display function allows original Brix or RI to be displayed alongside the equivalent sucrose SG result.

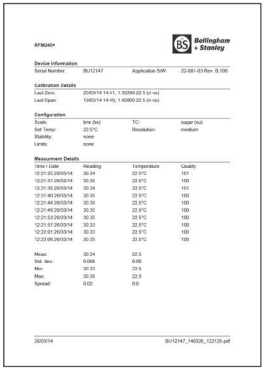
Other new features now standard on the RFM300 Series include RFID User Clearance, electronic signatures and audit trails that facilitate use in an FDA regulated environment (21 CFR part 11) as well as enhanced functionality via the new USB interfaces such as *Back-up & Clone* and *Print to Secure PDF*.

- Touchscreen or keypad
- Easy clean prism
- High accuracy (±0.01°Brix)
- Dual scale display
- Smart temperature stability
- Print to secure PDF

Specifications	RFM330 (RFM33F)	RFM340 (RFM34F)
Order Code		
RFM300-T	19-30	19-40
RFM300-M	19-35	19-45
Scales		
Refractive Index	1.32 – 1.58	1.32 – 1.58
Sugar (°Brix)	0 – 100	0 – 100
User Defined	100	100
Resolution		
Refractive Index	0.00001	0.000001
Sugar (°Brix)	0.01	0.001
Accuracy		
Refractive Index	± 0.00005	± 0.00002 (1.32 – 1.38 RI) ± 0.00004 (1.38 – 1.58 RI)
Sugar (°Brix)	± 0.04	**±0.01 (0 – 30 °Brix)** **±0.03 (30 – 100 °Brix)**
User Scale Library on-board	20+ preprogrammed scales including HFCS (3), wine (5), sugar (4), urine SG (3), Urea, sucrose SG (3), FSII, NaCl, Butyro etc. Plus customer programmable scales via PC.	
Presser Type	Polyacetal	
Reading Time	Minimum 4 seconds	
Measuring Temperature Range	0 °C or 10°C below ambient whichever is greater to 70 °C	
Temperature Sensor Accuracy	± 0.03°C	
Sample Temperature Stability	± 0.05°C	
Temperature Compensation		
Sucrose (°Brix)	5 – 70 °C	
AG Fluids	5 – 40 °C	
User Defined	Simple coefficient (units/°C) or polynomial function	
Temperature Stability Checks	None/delay time/repeatability/ Smart (independently selectable by Method)	
Interfaces	3 x USB (A), 1 x USB (B), 1 x Ethernet, 1 x Serial (RS232)	
Prism Seal	Silicon/Resin	

RFM340 Refractometer Enhanced Performance

RFM340	RI	°Brix
Scale	1.32-1.58 1) 1.32-1.38 2) 1.38-1.58	0-100 1) 0-30 2) 30-100
Resolution	0.000001 (6 d.p)	0.001 (3 d.p)
Precision	0.000005 (6 d.p)	**0.005 (3 d.p)**



RFM900-T Refractometers

Featuring a new touchscreen display and wide measuring range up to 1.70 RI and capable of measuring to six decimal places, the RFM900-T Series refractometers are ideally suited for use in the chemical, petrochemical, pharmaceutical, flavours and fragrance industries as well as for academic research. The RFM900-T series of refractometers combine the latest opto-electronic principles with durability and ease of use. RFM900-T refractometers feature RFID (Radio Frequency Identification) that allows users to identify themselves by simply swiping a tag across the top of the instrument to enable measurement and, in certain cases, access to the configuration menu.

A low-profile sample dish and non-contact presser makes sample application and cleaning easy. Readings can be taken automatically on the replacement of the presser, and over 8000 stored results can be easily viewed in tabular form on the instrument display. Peltier temperature control and intelligent temperature management ensures readings are only

Specifications	RFM960-T	RFM970-T	RFM990-Flow	RFM990-AUS32
Order Code	22-60	22-70	22-90	19-73
Scales				
Refractive Index	1.30 – 1.70	1.30 – 1.70	1.30 – 1.70	1.30 – 1.70
Sugar (°Brix)	0 – 100	0 – 100	0 – 100	0 – 100
User Defined	100	100	100	0 - 40% Urea
Resolution				
Refractive Index	0.0001	0.000001	0.00001	0.000001
Sugar (°Brix)	0.1	0.001	0.01	0.001
Accuracy				
Refractive Index	± 0.0001	± 0.00002	± 0.00002	± 0.00002
Sugar (°Brix)	± 0.1	± 0.02	±0.02	±0.02
Precision				
Refractive Index	± 0.00005	± 0.000005 (6 d.p.)	± 0.00002 (5 d.p.)	± 0.000005 (6 d.p.)
Sugar (°Brix)	± 0.05	± 0.005		± 0.005
Presser Type	Polyacetal	Polyacetal	Flowcell (optional)	Polyacetal
Temperature Compensation				Urea, ICUMSA (sugar),
Sucrose (Brix°)	5 – 80 °C			AG, None or
AG Fluids	5 – 40 °C			User Defined
User Defined	Simple coefficient (units/°C) or polynomial function			
Temperature Control	Peltier			
Temperature Stability Checks	None/delay time/repeatability/ Smart (independently selectable by Method)			
Measuring Temperature Range	0°C or 10°C below ambient whichever is the greater to 80°C			
Temperature Sensor Accuracy	± 0.03°C			±0.02 °C (at 20 °C[1])
Sample Temperature Stability	± 0.02°C			±0.01 °C (at 20 °C[1])
Prism Seal	Kalrez®			
Interfaces	3 x USB (A), 1 x USB (B), 1 x Ethernet, 1 x Serial (RS232)			

- Pharmaceutical
- Chemical
- Widest RI range
- Highest precision (±0.000005 RI)
- MEAN Method (USP/EP/BP)
- All RFM900s conform to ASTM D 1218, 1747, 2140 & 5006

taken when the sample and refractometer temperatures are both stable.

The instruments conform to a number of industry measurement standards and offer operational features that allow use in an environment controlled by FDA regulation 21 CFR Part 11.

The use of a Kalrez® gasket and sapphire prism facilitates placement in the harshest measurement environments including those in the pharmaceutical, petrochemical, aroma, flavour, fragrance and other high RI sectors.

RFM990-AUS32 Refractometer

The RFM990-AUS32 is an extremely high accuracy refractometer specifically designed to meet the stringent needs of the chemical manufacturing industry. Of particular interest is its compliance with the strictest of ISO procedures in relation to the manufacture of urea-based NOx reduction agents used as Diesel Exhaust Fluids, also known as DEF, AUS32 and AdBlue®.

ISO 22241 dictates the highest level of measurement must be achieved under the tightest limits of temperature control. In addition to the compliance with this norm, the RFM990-AUS32 is fitted with specific Urea scales and temperature compensation as well as an AUS32 Method that allows input of both the F factor and biuret content of the solution that is included in the analysis.

Being part of the RFM900 series of refractometers, users of the RFM990-AUS32 also benefit from common features such as RFID user identity/clearance, on-board data storage, limit checking and audit trails.

No matter how good the instrument performance, without good verification it is not possible to confirm the instrument meets the specification laid down in ISO 22241. Bellingham + Stanley offer a UKAS Certified Reference Material for this purpose at the equivalent RI value of Urea stated in the norm.

- Petrochemical model
- Premium performance
- Conforms to ISO 22241
- AUS32 Method (input criteria)

AdBlue® is a registered trademark of the VDA Verband der Automobilindustrie e.V.

Kalrez® is a registered trademark of DuPont Performance Elastomers LLC.

1. AUS32 performance – 20°C is mandatory.

Common Specifications – **Laboratory Refractometers**

Prism	Artificial Sapphire (1.76RI - Hardness 9.0 Mohs)
Prism Dish	316 Stainless Steel with PEEK spill barrier
Sample Illumination	Light Emitting Diode 589nm (100,000+ hours)
Reading Time	Minimum 4 seconds (stability checks on all models)
Instrument Housing	Acrylonitrile Butadiene Styrene (ABS)
Power	Instrument: 24 V DC, ±5%, <2A Power Supply Unit: 100-240V, 50-60Hz (supplied with instrument)
Humidity Range	<90% RH (non condensing)

ADP400 Polarimeters

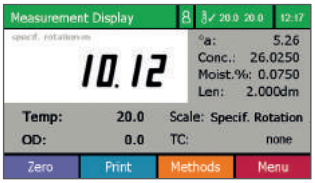
The ADP400 Series of general-purpose, single wavelength polarimeters are suitable for sugar, food, chemical and pharmaceutical industries where measurement is required to 3-decimal place resolution (°A) over a length between 10 and 200mm. The ADP400 polarimeters are available with or without XPC - Xylem's patented internal Peltier temperature control system.

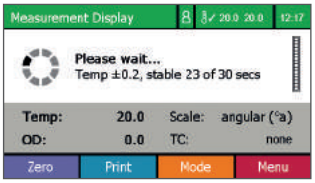
ADP400 series polarimeters feature a 'no maintenance' LED light source and interference filter with photodiode detector technology that provides sample readings up to 3.0 OD at the commonly used sodium (589nm) wavelength. Conveniently, ADP400 Series instruments use standard polarimeter tubes or for scarce samples, low volume luer taper tubes.

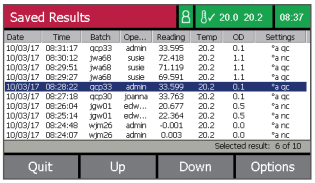
Specifications	Angular (°A)	ISS (°Z)
Scales	-355 to +355 (selectable)	-225 to +225
Resolution	0.01/0.001	0.01/0.001
Accuracy	± 0.010	± 0.030
Precision (Reproducibility)*	± 0.002	± 0.005

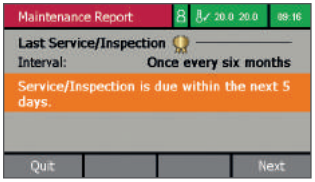
Common Specifications – **Laboratory Polarimeters & Saccharimeters (ADP/S 400 Series)**

Sample Illumination	Light Emitting Diode (100,000 hrs). Interference Filter 589nm (except ADS480: 850nm)
Beam Diameter	4mm
Optical Path Length	10 to 200mm
Optical Density Range	0.0 to 3.0 OD (except ADS480)
Reading Type	Selectable continuous measurement or single shot (ADP) or continuous (ADS)
Reading Time (seconds)	4-30 selectable by Method (AD) or 20 (ADS)
Instrument Housing	Polyurethane foam with aluminum base
Power	Instrument: 24 V DC, ±5%, <2A External PSU: 100-240V, 50-60Hz (supplied)
Humidity Range	<90% RH (non condensing)









ADP400 Series polarimeters now feature a full colour, 4" (10 cm) high definition display. Measurement may be expressed as angular degrees (°A), sugar (ISS) or user programmable scales, with standard Methods facilitating display of invert sugar, inversion (A-B) or, when applying other factors such as tube length and concentration, Specific Rotation (or concentration when entering specific rotation).

The ADP400 Series offers both continuous and 'single-shot' reading modes, the latter being ideal for pharmaceutical applications where a discrete value is required without interpretation by an operator.

The PHR-MEAN Method, integral to both ADP400 Series polarimeters, allows a number of different readings to be taken from a batch of samples and the statistical report, showing the average, high and low results together with standard deviation can then be printed or stored to file.

The expanded memory ensures that over 8000 measurements and recorded logs of instrument configuration can be saved and viewed or output to LIMS.

Calibration and configuration can be password protected, accessible by keypad entry or, for convenience, using a fully configurable RFID tag. This, together with the audit trail, facilitates operation in environments conforming to FDA regulation 21 CFR Part 11 or GLP. ADP400 Series polarimeters are also ideal for use within laboratories where compliance with Pharmacopoeia is required.

The ADP400 Series polarimeters incorporate a number of industry standard interfaces making it easy to connect to peripheral devices including barcode readers, printers and USB memory sticks for external storage. With the addition of a USB memory stick operators can output results to a secure PDF using the "Print to Secure PDF." The USB port can also be used to accept RS232 via an available adaptor.

There are two instruments in the ADP400 Series.

ADP430 polarimeter

The ADP430 is a fully featured instrument designed for use in applications where internal temperature control is not required or where the use of automatic temperature compensation or a water bath is preferred, such as within the food industry.

ADP450 Polarimeter

The ADP450 polarimeter with patented XPC technology features interchangeable contact Peltier plates facilitating measurement at a stable temperature using Peltier control. XPC technology conveniently stabilises the temperature of the sample being measured. With SMART temperature stability enabled, the ADP450 will only give a result when the instrument has displayed a stable temperature over a predetermined timeframe, making for reliable results in compliance with good laboratory practice.

- Peltier or waterbath
- Continuous or single read
- Three decimal places
- PHR-MEAN Method
- Conforms to USP/EP/BP
- Standard sample tubes

Temperature	ADP430	ADP450 (Peltier)
Order Code	37-30	37-50
Control	None or external waterbath	Patented XPC Technology
Compensation	None, ICUMSA, Quartz or User Defined	
Measuring Range	5-40 °C	15-35 °C
Sensor Accuracy	± 0.1 °C	± 0.1 °C
Stability	Waterbath dependent	± 0.2 °C
Stability Checks	None/delay on single-shot	None/delay or SMART

XPC Technology

- Fill the tube
- Slot the tube in to the XPC adaptor
- Place in to the ADP450
- Wait for SMART stability
- Record the reading

Polarimeter Tube – Spare Parts

Order Code	Description	Diameter	Quantity	Tube Type
35-60	Low strain cover glasses	15.5	12	Glass
35-64	Rubber washers for use between cover glass and end cap	15.5	12	
35-68	End caps, plastic	15.5	2	
35-20	End caps, metal	15.5	2	Glass
35-21	Rubber Glands for metal end cap tubes & fitting tool	15.5	12	
35-62	Low strain cover glasses	22.5	2	Flow
35-66	Rubber washers for use between cover glass and end cap	22.5	2	
35-88	End Caps, stainless steel	22.5	2	
35-79	Temperature sensor saddle	–	1	Low
35-80	Low strain cover glasses	20	6	Volume
35-81	Rubber washers for use between cover glass and end cap	20	10	

Polarimeter Tubes

Bellingham + Stanley polarimeter tubes are manufactured to high quality standards conforming to ICUMSA recommendations and are compatible with most makes of polarimeter.

Tube ends are precision ground with windows made from specially selected low strain glass in order to achieve highest accuracy optical rotation measurement.

Special tubes, XPC adaptors and cover glasses for ultra-violet measurement are also available. Please visit our website for further details.

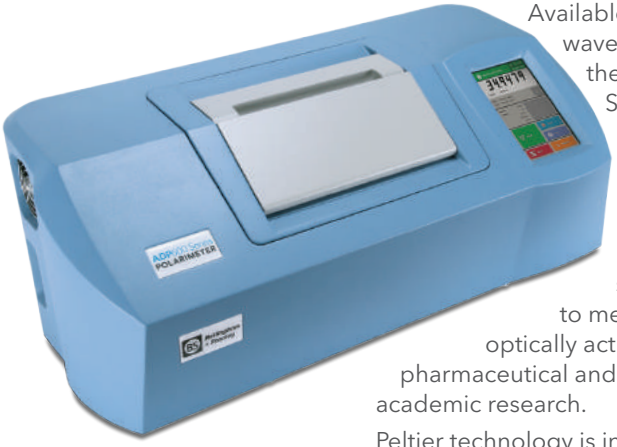
Code	Standard Glass – 8mm	Length	Fig.
35-29 35-30 35-28	Bubble type – to clear bubble from field of view Most suited to Model D7	100 200 50 – 200	1
35-46 35-47 35-45	Centre fill – for easy filling and placement of ADP temperature sensor	100 200 50 – 200	2
35-57 35-58 35-56	Cup – funnel shaped centre fill for viscous samples	100 200 50 – 200	3
35-10 35-11	Metal end – centre fill for aggressive chemicals and solvents	100 200	4
Volume: 5.02ml/100mm.			

Code	Flow & Temperature Control – 8mm	Lid code	Length	Fig.
36-57 36-58	Funnel flow-through tube	37-012 37-011	100 200	5
36-67 36-68	Continuous flow-through tube	37-012 37-011	100 200	6
36-77 36-78	Centre fill tube	37-010 37-009	100 200	7

Code	Low Volume – Leur – 5mm	Volume	Lid/Fig.
35-71	50mm stainless steel tube	1.0	37-010 Fig 8
35-72	25mm stainless steel tube	0.5	
35-73	10mm stainless steel tube	0.2	
35-74	5mm stainless steel tube	0.1	
35-76	50mm stainless steel tube with water jacket	1.0	
35-75	25mm stainless steel tube with water jacket	0.5	
35-78	50mm glass loaded PTFE tube	1.0	
35-77	25mm glass loaded PTFE tube	0.5	

All lengths in millimetres. Volumes in millilitres. All collar sizes 30mm diameter.
For use with ADP/S models, polarimeter tubes figure 5 to 8 require slotted lids.

ADP600 Polarimeters



Available as single, dual and multiple wavelength derivatives not only covering the visible spectrum, the new ADP600 Series of Peltier temperature controlled polarimeters are capable of measuring optical rotation to four decimal places in the highly sensitive ultra-violet region. This capability makes the instrument particularly suited for use by scientists wishing to measure chiral compounds and other optically active substances in the chemical, pharmaceutical and food sectors as well as for use in academic research.

- Single, dual & multiple wavelength models
- Four decimal place resolution
- Peltier temperature controlled
- High definition 7.4" touch-screen display

Peltier technology is intelligently applied to the sample chamber of the new polarimeters so that measurement can be accurately made without the need of an external waterbath. The ADP600 Series Polarimeters have two preset operating temperatures being 20 and 25 °C in accordance with European and United States Pharmacopoeia respectively and other user temperatures between 20 and 30°C may be configured via the instrument user interface.

ADP600 Series Polarimeters accept standard glass or

Specifications

Range (°A)	± 89 (-355 to +355 via Method selection)
Resolution (°A)	0.0001
Accuracy (°A)	± 0.003 (@546 & 589nm) / ± 0.005 (@325, 365, 405 & 436nm)
Temperature Range	15-35°C
Temperature Control / Accuracy	Peltier / ± 0.2°C
Temperature Compensation	None, sugar, quartz, user defined
Optical Density Range	0.0 to 3.0 OD
Methods	Specific Rotation, % Concentration, % Invert Sugar, % Inversion (A-B)
Temperature Set Points	20 & 25 °C (variable between 20-30 °C via Method)
Reading Time	15-60 seconds @ 546/589nm and 20/20°C (instrument/sample)
Tube Length	5-200mm
Tube Diameter	3-8mm
User Interface	High Definition 7.4" touch-screen colour display
Light Source	UV/Vis lamp (6V, 2A >1000hrs) and narrow band pass filter(s)
Interfaces	3 x USB (A), 1 x USB (B), 1 x Ethernet, 1 x Serial (RS232)
Power Supply	100-250V~, 50-60 Hz. <6A.

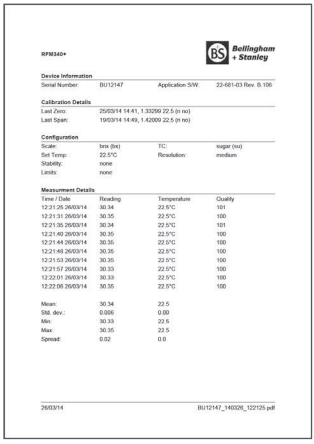
special low volume leur taper polarimeter tubes facilitating measurement across optical path lengths between 5 and 200m with tube diameters from 3 to 8mm being readable. Optional lids may be easily be fitted to the ADP600 Series Polarimeters, facilitating sample tube entry and exit.

Integral to operational simplicity is the full colour, high definition, touch-screen graphical user interface. A menu structure featuring a METHODS system makes for one-touch calibration and instrument configuration; especially where the specific rotation of a number of samples is being analysed over a wide range of concentratio ns, path lengths, temperatures and wavelengths. A "Mean Method" is also available, allowing a number of readings to be taken from a production batch with the mean being calculated and recorded once the experiment has been completed.

ADP600 Series Polarimeters have an extensive interfacing capability. Four USB ports provide excellent connectivity to, for example, convenient remote keyboards, printers, barcode readers and LIMS or PC, whilst the Ethernet connection may be used for networking as well as remote diagnostics or certification. The ADP600 Series on-board RFID reader may be used to identify users as well as sample tube lengths for recording and in particular, calculation of Specific Rotation.

Additionally the ADP600 Series Polarimeters feature a secure "print to PDF" function that may be configured to operate in secure environments in accordance with FDA regulation 21 CFR Part 11 and importantly, the ADP600 Series polarimeters meet all of the requirements, including wavelength directives of British, United States, European and Japanese Pharmacopoeia.

- Simple Methods system
- Accepts standard & low volume sample tubes
- Supports FDA regulation 21 CFR Part 11
- US/EP/BP/JP compliant


RFM340+

Bellingham + Stanley

Device Information

Calibration Details

Configuration

Measurement Details

Code	Description	Wavelengths(s)
37-61	**ADP610** single wavelength polarimeter	589nm
37-62	**ADP620** dual wavelength polarimeter	546 & 589nm
37-63	**ADP622** dual wavelength polarimeter	365 & 589nm
37-64	**ADP640** multiple wavelength polarimeter	405, 436, 546 & 589nm
37-65	**ADP650** multiple wavelength polarimeter	365, 405, 436, 546 & 589nm
37-66	**ADP660** multiple wavelength polarimeter	325, 365, 405, 436, 546 & 589nm

All ADP600 Series Peltier temperature controlled polarimeters are supplied with standard lids, two RFID tags, instruction manual and certificate of conformity.

ADS400 Series Saccharimeter

The ADS400 Series Saccharimeter is a purpose built polarimeter that displays results in the ISS (°Z) scale.

This series of Bellingham + Stanley instruments has been primarily designed for busy sugar laboratories, factories and tare houses. The ADS400 Series is available in 2 wavelengths: Sodium (589nm) and NIR (850nm), which facilitates "lead-free measurement". Both models can be purchased with or without XPC Technology – Xylem's patented Peltier temperature control system.

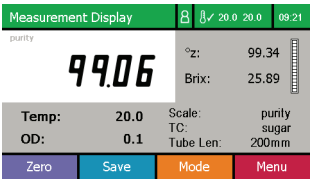
The ADS400 Series Saccharimeters are designed to operate in isolation but work best when connected to an RFM Refractometer to create a complete Purity system that facilitates accurate purity readings.

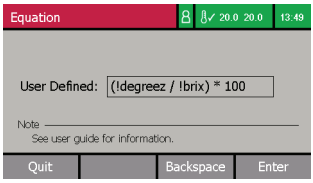
The ADS400 Series is built in the UK using a corrosion-free polyurethane foam case – sealed to prevent moisture and dust ingress to its optics. Low power consumption and low maintenance is achieved using an LED light source which offers light for the length of the product lifetime[1].

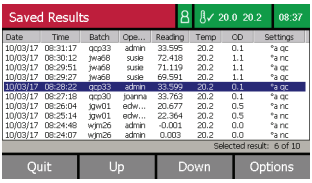
The external power unit keeps internal temperatures minimal and in combination with the sealed casing makes the ADS400 Series Saccharimeter a great choice for working in high humidity environments.

Thanks to its intelligent setup wizard, easy-to-use keypad with colourful HD display and intuitive software, operating the ADS400 Series is quick and simple. RFID login allows several levels of access, as well as offering an audit trail, meaning settings can be hidden away so users can only take readings; ideal for allowing use of the instrument no matter what level of training.

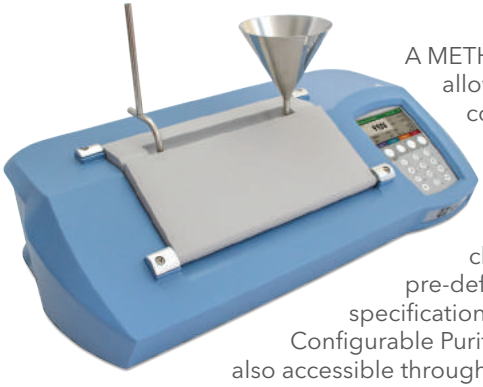
- ATC or Patented XPC Peltier
- ICUMSA and Tropical Scale ATC
- Funnel flow or standard tube packages
- High definition 4" full colour display
- Continuous or single shot readings







1 LED lifetime guaranteed through normal use and with no interference.



A METHODS system allows for quick configuration, with reading type (continuous or single-shot) and limit checking against pre-defined product specifications made simple. Configurable Purity equations are also accessible through the easy-to-use software using the keypad.

Latest Software Features

- Save over 8000 readings
- Methods system with limits
- Connectable to refractometer
- Onboard Purity
- User audit trail
- Date/Time for GLP
- USB "Back-up & Clone"
- User maintenance prompts

General Specifications	Sodium (589nm)	NIR (850nm)
Scales		
International Sugar Scale (°Z)	-225 to +225	-225 to +225
User Scales/Methods	100	100
Resolution		
International Sugar Scale (°Z)	0.01/0.001 (selectable)	0.01/0.001 (selectable)
Accuracy		
International Sugar Scale (°Z)	± 0.030	± 0.060
Precision (Reproducibility)		
International Sugar Scale (°Z)	± 0.005	± 0.010
Interfaces	1 x USB (A), 1 x USB (B), 1 x Ethernet	
Data Output	Print to USB, print to printer, csv, XML	

Temperature Specifications	ADS400 ATC	ADS400 XPC (Peltier)
Compensation	None, ICUMSA, Tropical, Quartz or User Defined	
Control	None or external waterbath	Patented XPC Technology
Measuring Range	5-40 °C	15-35 °C
Sensor Accuracy	± 0.1 °C	± 0.1 °C
Stability	Waterbath dependent	± 0.2 °C
Stability Checks	None/delay on single-shot	None/delay or SMART

The ADS400 Series Saccharimeter is available in predefined packages to make choosing the right system as simple as possible. All packages are supplied with appropriate cell, lid, onboard purity, LIMS logger PC software, RFID tags & certificate of conformity.

	ADS400 ATC			ADS400 XPC (Peltier)		
	200mm Glass	100mm Funnel	200mm Funnel	200mm Metal	100mm Funnel	200mm Funnel
Sodium (order code)	ADS435 37-25	ADS435-F100 37-26	ADS435-F200 37-27	ADS455 37-45	ADS455-F100 37-46	ADS455-F200 37-47
NIR (order code)	ADS438 37-85	ADS438-F100 37-86	ADS438-F200 37-87	ADS458 37-95	ADS458-F100 37-96	ADS458-F200 37-97

Accessories

Code	Peripherals & Cables	RFM700-M	RFM300+	RFM-T/M	ADP400	ADP600
55-14	CBM-910 Dot Matrix Printer - Serial: UK/Euro Plug 220V	✓	✓	✓	✓	✓
55-16	CBM-910 Dot Matrix Printer - Serial: USA Plug 110V	✓	✓	✓	✓	✓
55-18	Thermal printer USB: 110-240V, 50/60Hz	✓	✓	✓	✓	✓
54-02	Serial Cable for CBM910 Serial printer	✓	✓	✓	✓	✓
55-85	USB to RS232 Adaptor	✓	✓	✓	✓	✓
55-075	LAN cable male/male (2m)		✓	✓	✓	✓
55-081	USB Cable A to A male/male (2m)	✓	✓	✓	✓	✓
55-082	USB Cable A to B male/male (2m)	✓	✓	✓	✓	✓
55-82	Barcode Reader - USB	✓	✓	✓	✓	✓
55-86	USB Mini Keyboard	✓	✓	✓	✓	✓
55-88	USB Hub	✓	✓	✓	✓	✓

Code	Spare Parts	RFM700-M	RFM300+	RFM-T/M	ADP400	ADP600
22-017	Contact Presser for Viscous Samples		✓	✓		
22-80	RFM300+ Enhanced Protection Pack (EPP)		✓			
22-088	RFM300+ Spare Filter – EPP (20 pk)		✓			
26-292	RFM300+ Spare Filter – Std (20 pk)		✓			
22-498	RFM-T/M Spare Filter (12 pk)			✓		
26-155	Splash Cover	✓	✓			
19-204	Touchscreen Protector			✓		✓
19-203	Touchscreen Stylus			✓		✓
22-071	RFID tags (3 pk)		✓	✓	✓	✓
22-072	RFID tags (10 pk)		✓	✓	✓	✓
55-250	Waterproof Power Supply (IP65)	✓	✓	✓	✓	

Code	Waterbaths	Stability
56-44	Waterbath and Circulator Heat Model: 230V 50/60Hz	0.05 °C
56-45	Waterbath and Circulator Heat Model: 110V 50/60Hz	0.05 °C
56-46	Waterbath and Circulator Refrigerated Model: 230V 50Hz	0.05 °C
56-47	Waterbath and Circulator Refrigerated Model: 110V 60Hz	0.05 °C

Heat only model for use 5°C above ambient to upper limit of instrument. Refrigerated models 3°C to upper limit of instruments.

Features Guide

Refractometers

	RFM700-M	RFM300-T/M	RFM900-T
Brix / Refractive Index / User Scales	✓	✓	✓
Dual Scale Display Function		✓	✓
Equivalent SG Scale for Beverage		✓	
High RI Range			✓
Peltier Temperature Control		✓	✓
Delay Before Reading	✓	✓	✓
SMART Temperature Stability		✓	✓
Presser		✓	✓
Continuous / Auto-read	✓	✓	✓
Zero & Span Calibration	✓	✓	✓
Zero Calibration at any value < Span		✓	✓
Calibration & Configuration Audit Trail		✓	✓
On-board Multi-lingual Menu Structure	✓	✓	✓
Installation Wizard	✓	✓	✓
Security (Password)	✓	✓	✓
Facilitates 21 CFR Part 11		✓	✓
RFID User Clearance		✓	✓
Store Data (8000 results)	✓	✓	✓
View Data		✓	✓
Output Data	✓	✓	✓
GLP Printout (Date/Time)	✓	✓	✓
CSV Data String for LIMS/Print PDF	✓	✓	✓
Methods System		✓	✓
Mean Method (USP/EP/BP)		✓	✓
Petroleum Method ASTM D 2140, 1218, 1747, 5006			✓
Coffee Method		✓	✓
Beverage Method Citric Acid Correction, Apparent Brix/SG		✓	
Flow Cell Option	OPT	OPT	OPT
Hi Accuracy "Urea" option			✓
Remote PC Software	✓	✓	✓

Polarimeters

	ADS400	ADP430	ADP450	ADP600
Single Wavelength	✓	✓	✓	✓
Multiple Wavelength				✓
Peltier Temperature Control	OPT		✓	✓
Smart Temperature Stability	OPT		✓	✓
Single-Shot Read Mode	✓	✓	✓	✓
Angular (°A)	✓	✓	✓	✓
ISS (°Z)	✓	✓	✓	
Range Configuration (-355 to +355°A)		✓	✓	✓
Optical Density Display	✓	✓	✓	
ATC (Sugar/Quartz/None)	✓	✓	✓	✓
Zero & Span Calibration	✓	✓	✓	✓
Calibration & Configuration Audit Trail	✓	✓	✓	✓
Touch-screen Display				✓
On-board Multi-lingual Menu Structure	✓	✓	✓	✓
Security (password)	✓	✓	✓	✓
Facilitates 21 CFR 11		✓	✓	✓
RFID User	✓	✓	✓	✓
Reading Log (8000 results)	✓	✓	✓	✓
GLP Printout (Date/Time/Batch)	✓	✓	✓	✓
CSV Data String for LIMS	✓	✓	✓	✓
Print to Secure PDF	✓	✓	✓	✓
NIR Wavelength	OPT			
High OD Performance	✓	✓	✓	
Methods System	✓	✓	✓	✓
Mean Method (USP/EP/BP)		✓	✓	✓
Specific Rotation Method		✓	✓	✓
Concentration Method	✓	✓	✓	✓
% Inversion (Sucrose) or Invert Sugar	✓	✓	✓	✓
USB Connectivity	✓	✓	✓	✓
Flow Package Options	✓	OPT	OPT	OPT
Low Volume Cell Options	OPT	OPT	OPT	OPT
PC /LIMS Logger	✓	✓	✓	✓

OPT - optional extra at time of purchase.

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