DENVER INSTRUMENT

Electrochemistry

200 Series Meters
Model 250, 225, 220, 215

Advanced features are standard on all Denver Instrument 200 Series Meters.

Complete GLP/GMP/ISO documentation. All calibration points are time and date stamped. Results are recorded along with time, date, units, temperature, channel, and a stability indication. Add alphanumeric sample identification and a sample number with ease. All results are sent to a printer or computer and can easily be recalled.

Data logging and RS232 output. Press the Print key to send the current reading of all active channels to computer or printer. Use data logging to select a time interval for measurements to be taken and recorded. The internal data log stores up to 620 results and all points are automatically sent to the RS232 port. The bi-directional interface of this instrument also allows complete control of the meter via computer. Command strings can be sent by a computer for inline processes.

Standardization is easy. Just press the Standardization key and follow the standardization menu. 200 Series Meters provide easy-to-follow instructions for good lab technique. The meter will accept the buffer reading when stable and auto compensate for temperature. The meter also performs electrode diagnostics.

Calibration data is available for each standardization. Simply press the Cal Data button for a complete listing of calibration points, time and date of standardization along with electrode efficiencies. Press the graph soft key to see a graph of the calibration curve.

User friendly. The large, backlit display shows time, date, and all active channel measurements and units. Display multiple channels simultaneously. Plain language menus step you through each procedure and "soft keys" allow quick access to the most frequently used features. The help key is always ready with easy to understand descriptions of current options. Error messages clearly explain any problems, helping to ensure accurate measurements.

Great choice for multiple users. Four features help with uniformity in the use of the meter. Activate the standardization delay and the unit will not complete the standardization process until the programmed time has lapsed. Set the calibration reminder to ensure routine standardization. Use the strict calibration setting to prevent measurements when a calibration is due. Use data alarm to let the meter tell you when data is outside of your range. For further specifications see last page.

Research-Grade Precision
pH, mV, Temperature, ISE, Conductivity

pH

Exceptional pH measurement. Adjustable resolution to 1, 2 or 3 decimal places. Accuracy of 0.001 pH units. Standardize up to 5 calibration points. Choose from 26 preprogrammed buffers, create a custom set of up to 5 buffers or manually enter buffers. An error message will let you know if your electrode is out of specification. Point-to-point calibration and automatic temperature correction makes standardization very reliable.

mV

mV readings. Adjustable resolution of 1 or 0.1 mV. Perfect for oxidation-reduction potential (ORP) measurements. Create a relative mV offset for titrations and an array of other applications. Excellent for troubleshooting pH or ion selective electrode problems.

Temperature

Automatic or manual temperature compensation. Internally programmed temperature tables provide automatic temperature compensation when using Denver electrodes with integrated ATC or separate ATC probes. This means you have the most reliable calibration. Without an ATC probe or to use manual temperature, enter the sample temperature. Temperature can be displayed in °C, °F or K.

ISE

Great ion-selective measurement. Display units in %, ppt, ppm, ppb, mg/l, µg/l, M or a custom ion unit. Choose from fixed or floating point notation. Select from 14 different preprogrammed standard ions, or enter a custom ion name. Improve accuracy by entering up to seven standards for a point-to-point standardization curve.
Advanced ion measurement techniques are simplified. Easily perform known addition/subtraction or analate addition/subtraction analyses. The meter will prompt you through the steps of the addition and ask you for information it needs, then calculate and display the result.

Conductivity

Make conductivity measurements. Choose from readings in conductivity, resistivity, salinity or TDS. Select display units to float throughout range or fixed µs/cm, mS/cm, ohms/cm, Kohms/cm or Mohms/cm. Standardize up to 5 points for reliable calibration. Temperature correction can be set with a temperature coefficient from 0 to 4.0 % per °C or no temperature correction (for USP 23 compliant measurements).

Directly measure ppt NaCl salinity, ppt practical salinity, or total dissolved solids (TDS). Set a solids factor for your TDS measurements or let the meter calculate your solids factor. The four-band conductivity circuit makes this one of the most accurate conductivity meters available.

Modes for each model	
215	pH/mV/temp
220	pH/mV/temp/conductivity
225	pH/mV/temp/ISE
250	pH/mV/temp/conductivity/ISE

Introducing the Portable Laboratory
UltraBasic Portable Meters

Versatile UltraBasic Meters offer portable precision and simple operation.

These meters are truly easy-to-use:
- Simple one-button standardization
- Automatic electrode checking
- Automatic buffer recognition
- Easily enter one to three buffers

Features include:
- Waterproof – IP-67 rated
- Operated by 9 volt battery or AC power (with optional transformer)
- Simultaneous display of measurement and temperature (with optional ATC)
- Measurements to 0.01 pH, 0.1 mV or three significant figures ion concentration
- Accuracy of 0.01 pH, 0.2 mV or 0.34 % ion
- BNC connector works with standard electrodes
- Automatic temperature compensation with optional ATC or combination pH/ATC probes

Ultra-easy to use, these quality portable meters from Denver Instrument offer ruggedness, precision and reliability. Denver Instrument UltraBasic meters are now available in lower cost versions with the same great User Interface that makes the Denver BASIC Meter popular. Denver UltraBasic Portable Meters come in three models: pH/Temperature, pH/mV/Temperature and pH/mV/Ion/Temperature.

UltraBasic Portable Meters are ergonomically designed to fit comfortably in either hand. The sealed waterproof case with IP-67 rating, allows the meter to be fully immersed in water to a depth of 1 meter. Perfect for field use, battery operation includes automatic shutoff to prolong life.

Announcing a Revolution in Electro-chemical Analysis

UltraBasic Benchtop Meters

Versatile UltraBasic Meters offer precision and simple operation.

These meters are truly easy-to-use:
- Simple one-button standardization
- Automatic electrode checking
- Auto-buffer recognition from 3 sets of 16 buffers
- Easily enter one to three buffers
- Large display clearly shows measurement values
- Icons show meter status
- Easy-to-recall slope values from standardization

Features include:
- Automatic Temperature Compensation with optional ATC or combination pH/ATC probes
- Simultaneous pH or mV and temperature display
- Measurements to 0.01 pH
- Accuracy better than 0.01 pH
- UB-10 allows toggle between pH and mV reading

Ultra-easy to use, these quality meters from Denver Instrument offer precision and reliability. Denver Instrument quality meters are now available in lower cost versions with the standard features that make the Denver BASIC Meter so popular.

Denver UltraBasic Benchtop Meters are available in two models. UB-5 offers precision pH and temperature measurement at a great price. Select the UB-10, with additional mV mode, for ORP (redox potential) or to monitor and diagnose pH electrodes.

Choose a kit with the best electrode for your application. The optional base and arm are available for both models.

Plastic-body gel-filled pH electrode. For field or plant measurements, where low-maintenance is desired. Polymer body, pH 0 to 14 low resistance glass, gel-filled reference with fiber junction, built-in bulb protector, BNC connector, temperature range –5 °C to 80 °C.
Automatic temperature compensating probe. For temperature measurement and correction. Fast response stainless steel body, 0.2 (4.7 mm) diameter, 4.7 (120 mm) length.

Specifications UltraBasic Portable Meters

Model	UP-5 pH/temp	UP-10 pH/mV/temp	UP-25 pH/mV/Ion/temp
pH range	0.00–14.00	0.00–14.00	0.00–14.00
pH resolution	0.01	0.01	0.01
pH accuracy	0.005 pH	0.005 pH	0.005 pH
mV range		–1800.0–1800.0	–1800.0–1800.0
mV resolution		0.1	0.1
mV accuracy		0.2 mV or ± 0.5 %	0.2 mV or ± 0.5 %
Temperature range	0.0–100.0 °C	0.0–100.0 °C	0.0–100.0 °C
Temperature resolution	0.1 °C	0.1 °C	0.1 °C
Temperature accuracy	0.2 °C	0.2 °C	0.2 °C
Ion range			0.0001–99900
Ion resolution			1, 2 or 3 sig figures
Ion accuracy			0.34 %

Common Specifications	
Weight	0.6 lb (0.27 kg)
Dimensions (L x W x H)	6.5 x 4 x 1.3" (16.5 x 10.2 x 3.3 cm)

Meter Only includes meter, 9 V battery and manual.
Meter Kit includes meter, 9 V battery, combination pH electrode and manual.

Specifications UltraBasic Benchtop Meters

Model	UB-5 pH/temp	UB-10 pH/mV/temp
pH range	0.00–14.00	0.00–14.00
pH resolution	0.01	0.01
pH accuracy	0.005 pH	0.005 pH
mV range	–	–1800.0–1800.0
mV resolution	–	0.1
mV accuracy	–	0.2 mV or 0.05 %
Temperature range	0.0–100.0 °C	0.0–100.0 °C
Temperature resolution	0.1 °C	0.1 °C
Temperature accuracy	0.2 °C	0.2 °C

Common Specifications	
Weight	0.6 lb (0.27 kg)
Dimensions (L x W x H)	9.0 x 4.75 x 3.125" (229 x 121 x 79 mm)

Meter Only includes UB-5 or UB-10 meter, manual and power supply.
Meter Kit includes UB-5 or UB-10 meter and combination pH electrode, manual and power supply.
Meter with Deluxe Kit includes UB-10 meter, base, arm, combination pH/ATC electrode, manual and power supply.
Meter with Deluxe Bio-Kit includes UB-10 meter, base, arm, tris-compatible combination pH/ATC electrode, manual and power supply.

Electrodes

High-Performance Electrodes, Conductivity Cells and Ion-Selective Electrodes

Ion-Selective Electrodes

Fluoride, Chloride and Silver/Sulfide Electrodes
State-of-the-art, convenient, combination ISEs (with built-in reference electrodes) for Fluoride, Chloride and Silver or Sulfide measurement. Membranes are LaF_3 single crystal membrane (F^-), solid-state $Ag_2S/AgCl$ (Cl^-) or solid-state Ag_2S (Ag^+/S^{--}) refillable references are single junction (F^-) or double junction (Cl^- and Ag^+/S^{--}) with high flow rate plastic sleeve junctions for accurate measurements, durable epoxy body, 12 mm diameter, 110 mm length, BNC connector.
· *Fluoride Combination ISE*
Cat. No. 300739.1
· *Chloride Combination ISE*
Cat. No. 300742.1
· *Silver/Sulfide Combination ISE*
Cat. No. 300762.1

Nitrate, Potassium and Calcium Electrode
Convenient combination ISEs use solvent-polymer PVC membrane technology. Built-in refillable reference electrodes are single junction (Ca^{++}) or double junction (NO_3^- and K^+) with high flow rate plastic sleeve junctions, durable epoxy body, 12 mm diameter, 120 mm length, BNC connector.
· *Nitrate Combination ISE*
Cat. No. 300743.1
· *Potassium Combination ISE*
Cat. No. 300744.1
· *Calcium Combination ISE*
Cat. No. 300745.1

Sodium Electrode
Combination ISE uses a sodium selctive glass membrane. Build-in liquid-filled reference electrode, glass body, 12 mm diameter, 110 mm length, BNC connector.
· *Sodium combination ISE*
Cat. No. 300741.1

Combination ORP Electrode
Used to measure ORP (Oxidation Reduction Potential, or Redox Potential) in samples such as industrial waters. Convenient combination electrode includes Ag/AgCl reference with ceramic junction, large area platinum disc sensing element. BNC connector.
· *ORP (Redox) Combination ISE*
Cat. No. 300746.1

Ammonia Electrode
Combination ISE uses replaceable screw-on porous Teflon membrane module, Epoxy body, 12 mm diameter, BNC connector.
· *Ammonia Combination ISE*
Cat. No. 300740.1
· *Replacement membranes (4 pack)*
Cat. No. 301252.1

pH and pH/ATC Electrodes

pH/ATC Plastic-body Combination Electrode
For routine pH measurements, pH range 0 to 14, Ag/AgCl reference with free-flow fiber junction, "3-in-1" electrode has built-in temperature, integral glass bulb guard, 12 mm diameter, 120 mm length, temperature range –5 °C to 80 °C.
· *3M KCl liquid-filled electrode, BNC and 2.5 mm phone plug connectors. Standard electrode for Denver UltraBasic Meter with Deluxe Kit.*
Cat. No. 300728.1

High Performance pH/ATC Glass-body Electrode
For all pH measurements, including TRIS samples. Glass body, pH 0 to 14 low resistance break resistant toughened glass, super-stable 3M KCl liquid-filled reference cartridge system with nonclogging Free-Flow platinum junction, built-in temperature, BNC and 2.5 mm phone plug connectors, temperatur range –5 °C to 100 °C.
· *For use with all Denver Meters. Standard electrode for Denver 200 series and with UltraBasic Meter with Deluxe Bio-Kit.*
Cat. No. 300729.1

High Performance Sleeve-Junction pH Electrode
For routine or difficult pH-measurements, viscous or low ionic strength samples. Polymer body, pH 0 to 14 low resistance glass, liquid-filled 3M KCl reference, adjustable flow rate plastic sleeve junction provides control over flow rate, allowing more accurate measurements. BNC connector, temperature range –5 °C to 100 °C.
· *For use with all Denver Meters.*
Cat. No. 300738.1

pH Glass-body Combination Electrode
For all pH measurements, including TRIS samples. Glass body pH 0 to 14 low resistance break-resistant glass, super-stable 3M KCl refillable reference cartridge system with nonclogging Free-Flow platinum junction. BNC connector, temperature range –5 °C to 100 °C.
· *For use with all Denver Meters.*
Cat. No. 300731.1

Micro Glass-body Combination pH Electrodes
For pH measurements in narrow containers, test tubes and labware. pH 0 to 14 low resistance glass, 3M KCl refillable reference system with nonclogging platinum junction, BNC connector, body diameter 0.20" (5 mm).
· *For use with all Denver Meters.*
Cat. No. 300736.1

Flat-Surface Combination pH Electrode
For pH measurements of small volumes or surfaces such as meats, cheese, leather or agar. Glass-body gel-filled sealed reference, pH 2 to 13 low resistance glass, temperature range –5 °C to 50 °C, BNC connector.
· *For use with all Denver Meters.*
Cat. No. 300737.1

Plastic-body Gel-filled pH Electrode
For field or plant measurements, where low maintenance is desired. Polymer body, pH 0 to 14 low resistance glass, gel filled reference with fiber junction, built-in bulb protector, BNC connector, temperature range –5 °C to 80 °C.
· *For use with all Denver Meters.*
Cat. No 300735.1

Automatic Temperature Compensating Probe
For temperature measurements and correction. Fast response stainless steel body, 4.7 mm diameter, 120 mm length.
· *With 2.5 mm phone plug connector for Denver Meters.*
Cat. No. 300733.1

Conductivity Cells for 200 Series Meters
Four band platinum band conductivity cells offer better linearity and improved accuracy, built-in temperature, plastic-body, 12 mm diameter, cell constants from 0.5 to 10 cm^{-1}. Removable outer body for cleaning.
· *Conductivity/ATC cell, 0.5 cm^{-1}, Multi-pin connector for Denver 200 Series Meters.*
Cat. No. 301046.1
· *Conductivity/ATC cell, 1 cm^{-1}, Multi-pin connector for Denver 200 Series Meters.*
Cat. No. 301047.1
· *Conductivity/ATC cell, 10 cm^{-1}, Multi-pin connector for Denver 200 Series Meters.*
Cat. No. 301048.1

Multi Sense Conductivity/pH/ATC Cells
For Denver 200 Series Meters Super combination electrode includes a two-band platinum conductivity cell, combination pH-electrode with gelled reference and an ATC temperature sensor. Plastic body, standard 12 mm diameter and 120 mm length. Cell constant 1.0 cm^{-1}.
· *Conductivity/pH/ATC Cell, BNC and multi-pin connectors for Denver 200 Series Meters.*
Cat. No. 301058.1

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200 Series

UB-5, UB-10

UP-5, UP-10, UP-25

Specifications/Ordering Information for 200 Series

Modes	pH	mV	Temperature
Range	–2.000 to 20.000	± 2400.0	–5.0 to 105.0 °C
Resolution	0.001/0.01/0.1	0.1/1	0.1
Accuracy	± 0.001 pH	± 0.05 mV	± 0.1 °C
Temp compensation	Automatic and manual: –5 to 105 °C		
Slope control	Automatic, 90 to 105 %; manual, 80 to 110 %		
Environment	15 to 40 °C, from 0 to 90 % relative humidity		
Ion mode (Models 250/225)			
Range	1.00 x 10^{-9} to 9.99 x 10^{9}		
Resolution	1, 2, 3 significant digits		
Relative accuracy	± 0.09 n %		
Conductivity mode (Models 250/220)			
Conductivity range	0 to 300.000 µs/cm (depending on cell constant)		
Relative accuracy	0.5 % of reading		
Salinity ranges	Autoranging, 0.01 to 70 ppt NaCl equivalent salinity		
	Autoranging, 0.01 to 42 ppt practical salinity		
Resistivity	30 ohm•cm to 1, 10 or 20 megohm•cm (at cell constants of 10, 1, 0.5 cm^{-1} respectively). Autoranging units; readout in ohm•cm, kilohm•cm, or megohm•cm. Fixed units: kilohm•cm		
Total dissolved solids	0.005 to 1.5 x 10^{5} mg/L (at 0.5 solids factor, depending on cell constant)		
Temp coefficient	Software configurable; off or on, 0 to 4 %/°C		
Meter kit includes: Meter, power supply, high performance glass-body pH/ATC Free-flow Platinum Junction electrode, electrode arm and operation manual.			