Agilent Electrochemistry Meters, Electrodes, and Solutions

QUICK, PRECISE MEASUREMENTS UNDER ANY CONDITIONS

The Measure of Confidence

Agilent Technologies

TABLE OF CONTENTS

Agilent's Electrochemistry Meters deliver rugged simplicity and fast, reliable data

Designed by chromatographers for chromatographers

Chromatographers around the world rely on Agilent LC instruments and columns for the highest quality and most reliable performance.

Now, our Agilent pH, DO, ISE, Conductivity and Multi-Parameter Meters and electrodes continue this tradition of excellence, giving you the ease-of-use, durability, and accurate results your analyses demand. Features such as simplified controls, waterproof connectors, and multi-parameter measurement capabilities make Agilent pH, DO, ISE, Conductivity and Multi-Parameter Meters your first choice for a broad range of applications, including:

General HPLC: Use Agilent pH meters to adjust and monitor the pH of your mobile phase for optimal LC column performance.

Environmental: Agilent pH and ISE meters meet stringent regulatory demands for analyzing wastewater or drinking water, evaluating fresh or salt water, and monitoring soil conditions.

Food safety: Agilent pH meters help you make sure that standards for manufacturing and quality control are met.

Consumer products: With Agilent pH and ISE meters, you can be confident that you are getting the accurate pH and Ion Selective Electrode (ISE) measurements you need for formulation, QA/QC, and finished product labeling.

Pharmaceutical: You can trust Agilent pH meters to give you reliable, repeatable, and precise pH measurements of solutions of pharmaceutical formulations.

In addition, Agilent offers a full line of electrodes that are also compatible with your existing electrochemistry meters, so you can keep all your meters operating at peak performance.

Developed with chromatographers in mind, Agilent meters and electrodes apply the same high standards we use for our instruments and columns.

To learn more about Agilent Electrochemistry Meters and electrodes, or to order now, visit **www.agilent.com/chem/phmeters**

Every Agilent Meter combines intuitive design with rapid, accurate readings

3200P pH Meter Specifications*

Specifications		3200P
Range	pH	-2.000-20.000 pH
	mV	(-1999.9 - 1999.9) mV
	Temperature	-5.0-110.0 °C
Resolution	pH	0.1/0.01/0.001 pH
	mV	0.1 mV
	Temperature	0.1°C
Accuracy	pH	±0.002 pH
	mV	±0.03% FS
	Temperature	±0.1°C
Temperature compensation		Manual/Auto -5.0-110.0 °C
Power		Universal AC power adapter 100 V-240 V, 50/60 Hz**
Dimension (L×D×H) [mm]		190×190×105
Weight (kg)		1

*EC Print software for easy and direct printing and EC Firmware software are available for free download at www.agilent.com/chem/phmeters

**Shipped with meter

3200P standard pH meter, G4383A

Multi-parameter water quality meters

Simultaneously measure pH/pX, ion concentration, ion electrode potential (mV), conductivity (TDS, salinity), DO (concentration and saturation), temperature, and more.

3200M Multi-parameter Analyzer Specifications*

Specifications		3200M
Range	pH	-2.000-20.000 pH
	pX	0.000-14.000 pX
	mV	-1999.9-1999.9 mV
	Conductivity	0.000 µS/cm-2000 mS/cm
	Resistivity	5.00 Ω.cm-100.0 MΩ.cm
	TDS	0.000 mg/L-1000 g/L
	Salinity	0.00%-8.00% (Chinese version) 0.0-80.0 g/L (English version)
	DO	0-45.00 mg/L
	DO saturation	0.0-300.0%
	Ion concentration range	0-19990
	Concentration unit	mol/L, mmol/L, g/L, mg/L, ug/L (Chinese version) mol/L, ppm, %, mg/L, ug/L (English version)
	Temperature	-5.0-110.0 °C
Resolution	pH/pX	0.1/0.01/0.001 pH/pX
	mV	0.1 mV
	Ion concentration	Four effective digits (Scientific notation)
	DO	0.01 mg/L
	DO saturation	0.1%
	Temperature	0.1 °C
Accuracy	pH/pX	±0.002 pH/pX:pXII:± 0.005 pX
	mV	±0.03% FS
	Ion concentration	±0.3%
	Conductivity	±0.5% FS
	Resistivity	±0.5% FS
	TDS	±0.5% FS
	Salinity	±0.1%
	DO	±0.10 mg/L
	DO saturation	±2.0%
	Temperature	±0.1 °C
Power	Universal AC power adapter 100 V-240 V, 50/60 Hz**	
Dimensions (LxDxH) [mm]	190×190×105	
Weight (kg)	1	

*EC Print software for easy and direct printing and EC Firmware software are available for free download at www.agilent.com/chem/phmeters

**Shipped with meter

To learn more about Agilent Electrochemistry Meters and electrodes, or to order now, visit **www.agilent.com/chem/phmeters**

Cell Constant and Correspondent Measuring Range

Cell constant (K) (cm^{-1})	0.001	0.01	0.1	1.0	10.0	100
Measuring range for solutions	0.000 µS/cm-1.999 µS/cm	0.000 µS/cm-19.99 µS/cm	0.200 µS/cm-199.9 µS/cm	2.00 µS/cm-19.99 mS/cm	20.0 µS/cm-199.9 mS/cm	200 mS/cm-2000 mS/cm

Highly stable ion meters

When matched with an ion-selective electrode and reference electrode, ion meters can measure corresponding electrode potential (mv), pX, and ion concentration

3200I ion meter, G4386A

3200I Ion Meter Specifications*

Specifications		3200I
Range	pH	-2.000-20.000 pH
	pX	0.000-14.000 pX
	mV	-1999.9-1999.9 mV
	Ion concentration range	0-19990
	Concentration unit	mol/L, mmol/L, g/L, mg/L, µg/L (Chinese version) mol/L, mg/L, %, mg/L, µg/L (English version)
	Temperature	(-5.0-110.0) °C
Resolution	pX	0.1/0.01/0.001 pH/pX
	mV	0.1 mV
	Ion concentration	Four effective digit (Scientific notation)
	Temperature	0.1 °C
Accuracy	pX	±0.002 pH/pX:pXII: ±0.005 pX
	mV	±0.03% FS
	Ion concentration	±0.3%
	Temperature	±0.1 °C
Power		Universal AC power adapter 100 V-240 V,50/60 Hz**
Dimension (L×D×H) [mm]		190x190x105
Weight (kg)		1

*EC Print software for easy and direct printing and EC Firmware software are available for free download at www.agilent.com/chem/phmeters

**Shipped with meter

Full-range conductivity meters

Measure conductivity, resistivity, total dissolved solid (TDS), salinity, and present solution temperature.

3200C conductivity meter, G4384A

3200C Conductivity Meter Specifications*

Specifications		3200C
Range	Conductivity	0.000 µS/cm-2000 mS/cm
	Resistivity	5.00 Ω.cm-100.0 MΩ.cm
	TDS	0.000 mg/L-1000 g/L
	Salinity	0.00%-8.00% (Chinese version) 0.0-80.0 ppt (English version)
	Temperature	(-5.0-110.0) °C
Resolution	Conductivity	Four effective digital, and the lowest level is 0.001 µS/cm
	Temperature	0.1 °C
Accuracy	Conductivity	±0.5% FS
	Resistivity	±0.5% FS
	TDS	±0.5% FS
	Salinity	±0.1%
	Temperature	±0.1 °C
Cell constant		0.001, 0.01, 0.1, 1.0, 10, 100cm^{-1}
Compensation range of cell constant		±20% of Standard constant value
Temperature compensation range		(0-50.0) °C
Conductivity and TDS standard temperature		25.0 °C
Salinity standard temperature		18.0 °C
Power		Universal AC power adapter (100 V-240 V, 50/60 Hz)**
Dimension (L×D×H) [mm]		190×190×105
Weight (kg)		1

*EC Print software for easy and direct printing and EC Firmware software are available for free download at www.agilent.com/chem/phmeters

**Shipped with meter

To learn more about Agilent Electrochemistry Meters and electrodes, or to order now, visit **www.agilent.com/chem/phmeters**

Quick-response dissolved oxygen meters

Membrane electrode measures DO concentration and saturation of water solutions.

3200D dissolved oxygen meter, G4385A

3200D Dissolved Oxygen Meter Specifications*

Specifications		3200D
Range	DO	(0-45.00) mg/L
	DO saturation	(0.0-300.0)%
	Temperature	(-5.0-110.0) °C
Resolution	DO	0.01 mg/L
	DO saturation	0.1%
	Temperature	0.1°C
Accuracy	DO	±0.10 mg/L
	DO saturation	±2.0%
	Temperature	±0.1 °C
Temperature compensation		Automatic: 0.0-45.0 °C
Standard temperature		(20±1) °C
Salinity calibration		(0.0-50.0) g/L
Barometric pressure calibration		(60.0-110.0) kPa
Power		Universal AC power adapter (100 V-240 V, 50/60 Hz)**
Dimension (L×D×H) [mm]		190×190×105
Weight (kg)		1

*EC Print software for easy and direct printing and EC Firmware software are available for free download at www.agilent.com/chem/phmeters

**Shipped with meter

Analyst-friendly features optimize your measurements and ensure accuracy

Your rapidly changing work environment demands speed and productivity without jeopardizing results. That is why all Agilent meters and electrodes are designed for easy operation, even by non-technical users, while still producing the most reliable readings.

- Unique electrode reference system, backed by our qualified material and manufacturing process, delivers fast, reliable response during meter operation.
- Rugged design stands up to the toughest indoor and outdoor conditions.
- High-endurance protective glass and multi-layer composite electrodes prevent breakage caused by frequent use, even in demanding environments.

EC Print software for easy and direct printing and EC Firmware software are available for free download at www.agilent.com/chem/phmeters

3200P standard pH meter, G4383A

User-friendly control panel simplifies your measurements and ensures accurate results, regardless of technical knowledge or skill level.

To learn more about Agilent Electrochemistry Meters and electrodes, or to order now, visit **www.agilent.com/chem/phmeters**

Agilent Electrochemistry Meters: rigorously evaluated for durability and safety

Our environmental test specifications ensure that Agilent Electrochemistry Meters will be rugged performers in your lab, just like Agilent columns and instruments.

Environmental Test Specifications	
Operating ambient temperature	0-50 °C
Operating relative humidity	5-95%, no condensation
Storage temperature	Meter: -40-70 °C; Electrode: -15-55 °C
Vibration and shock	Instrument test and package test

Module Specifications

Type/Model	Key Industries/Applications	Measurements	Details
Standard pH Meter (3200P)	• Pharmaceutical • Food safety Biological agriculture • Environmental Water quality	• Acid and alkali levels • Electrode potential (mV) values of relevant ions	• G4383A for 3200P meter only • G4391A for basic package with electrode, electrode holder and buffer • G4392A for kit with triode combination electrode, electrode holder and buffer
Conductivity Meter (3200C)	• Environmental • Petrochemical • Food safety • Biological	• Conductivity • Resistivity • Total dissolved solid (TDS) • Salinity • Present Solution temperature value	• G4384A for 3200C meter only • G4393A for package with 3200C meter, electrode and electrode holder
Dissolved Oxygen (DO) Meter (3200D)	• Environmental Sewage disposal Tap water source monitoring • Food safety Aquaculture Beverage production Biological agriculture • Scientific research	• Dissolved oxygen concentration • Saturation of water solution	• G4385A for 3200D meter only • G4395A for package with 3200D meter, electrode and electrode holder
Ion Meter (3200I)	• Food safety Biological agriculture • Petrochemical • Environmental protection • Scientific research • Disease control	• Electrode potential (mV) values • pX value and ion concentration	• G4396A for 3200I meter only • G4396A for package with 3200I meter, pH electrode, electrode holder and buffer • G4397A for Fluoride Ion package with 3200I meter, Fluoride ion electrode and electrode holder and buffer
Multi-Parameter Meter (3200M)	• Water quality • Disease control • Environmental protection • Biological agriculture • Scientific research	Simultaneously measures pH/pX, ion concentration, ion electrode potential (mV), conductivity, Total Dissolved Solids, salinity, dissolved oxygen, and temperature	• G4378A for 3200M meter • G4398A for 3200M meter, electrode, electrode holder and buffer

To learn more about Agilent Electrochemistry Meters and electrodes,
or to order now, visit **www.agilent.com/chem/phmeters**

Module specifications

Agilent provides modules to fit your most challenging applications.

Module	Specifications	Benefits
3200P 3200C 3200D 3200I 3200M	Temperature: -5.0-110.0 °C	Compatible with a wide temperature range
	Measuring mode: continuous/timed reading/auto-lock	Lets you perform a variety of measurements with one meter
	Dot-matrix LCD	Fast interpretation of results Easy for novices to use
	Numeric operating keys	Simplified operation for all skill levels
3200P 3200I 3200M	Automatic identification for buffers	Choice of NIST and GB buffers
	Impedance: $3x10^{12}\ \Omega$	Choose from a wider range of electrodes for your sample
	Accuracy of DO: ±0.10 mg/L	Precise measurements and excellent temperature compensation provide outstanding DO accuracy
3200I 3200M	Provides Ion measurement modes for H+, Ag+, Na+, K+ NH4+, Cl-, F-, NO3-, BF4-, CN-, Cu2+, Pb2+ and Ca2+	Easily exchanged electrodes (or ISEs) allow flexible multi-ion analysis
	Different units can be switched freely	Automatic functions optimize measurements and ensure accurate results
	Measuring mode in Ion concentration: direct reading, "Standard" addition, sample addition, GRAN plot addition	Convenience

Wide range of Agilent electrodes help meet the needs of any application

3200EA electrode holder, G4389A

Unlike single-layer breathable membrane electrodes, Agilent electrodes are made from multi-layered composite materials for extra durability. They also feature a specific barrier to protect the glass bubble against breakage.

What's more, the unique reference system on every Agilent electrode is backed by our uncompromising materials quality and manufacturing process – giving you fast response and high accuracy.

The electrodes shown here use universal connections, so you can use them interchangeably on Orion 3 star, 4 star meter, Hanna HI2221 and Mettler FE20pH.

pH combination electrode, 5190-3988

pH combination electrode, 5190-3989

pH combination electrode, 5190-3993

pH combination electrode, 5190-3992

pH triode combination electrode, 5190-3990

pH electrode, 5190-3991

pH P3211	pH P3212	pH P3214	pH P3213	pH P3311	pH P3111
• Combination electrode with glass body • Refillable • BNC connector • Glass bulb measuring tip	• Combination electrode with PC body • Not refillable • BNC connector • Glass bulb measuring tip	• Combination electrode with ABS body • Not refillable • BNC connector • Spear-tipped measuring tip	• Combination electrode with PC body • Refillable • BNC connector • Flat measuring tip	• Combination electrode with glass body • Refillable • BNC and miniDIN4 connector • Glass bulb measuring tip	• Electrode with glass body • Not refillable • BNC connector • Glass bulb measuring tip

To learn more about Agilent Electrochemistry Meters and electrodes, or to order now, visit **www.agilent.com/chem/phmeters**

P3211 pH combination electrode, 5190-3988

Recommended uses*

Industry	Sample	P3211	P3212	P3214	P3213	P3311	P3111
Drinks and Dairy products	Milk	✓	✓			✓	✓
	Soy Sauce	✓	✓			✓	✓
	Beer	✓	✓			✓	✓
	Soft drinks (ice black tea)	✓	✓			✓	✓
Food and Agricultural products	Compound fertilizer		✓				
	Jam						✓
	Meat			✓			
	Vegetables	✓	✓			✓	✓
	Waste	✓				✓	
Chemical reagents and electrolytes	Electroplate liquid	✓				✓	✓
Coatings, dyes, and latex	Suspended solid (soil)		✓				
Daily water	Tap water	✓	✓			✓	
	Drinking water (barreled water)						✓ (Static)
	Distilled water						✓ (Sealed)
Drug or biological samples	Protein sample/protein powder	✓	✓			✓	
Surface measurement	Droplet size of the sample				✓		
	Textiles				✓		
Cosmetics and viscous samples	Shampoo	✓				✓	✓
	Cosmetics paste	✓				✓	✓

*Laboratory test; for reference only.

pH Electrode Specifications

Model	P3211	P3212	P3214	P3213	P3311	P3111
Measurement range	(0-14) pH	(0-14) pH	(0-14) pH	(0-14) pH	(0-14) pH	(0-14) pH
PTS	≥ 97%	≥ 97%	≥ 97%	≥ 97%	≥ 97%	≥ 98.5%
Response time	30s	30s	60s	60s	30s	60s
Temperature accuracy	–	–	–	–	± 0.5°C	–
Electrode impedance	≤ 300 MΩ	≤ 300 MΩ	≤ 500 MΩ	≤ 500 MΩ	≤ 300 MΩ	≤250 MΩ
Reference type	Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl	–
Liquid junction material	Ceramic	Porous polymer	Fiber	Fiber	Ceramic	–

ORP electrode,
5190-3999

Fluoride combination ISE,
5190-4002

Ammonia combination ISE,
5190-4004

Sodium combination ISE,
5190-4005

ORP8211 Oxidation Reduction Potential	19111 Fluoride Combination ISE	I9121 Ammonia Combination ISE	I9131 Sodium Combination ISE
Combination electrode with glass body Refillable BNC connector	Combination electrode with PC body Refillable BNC connector	Combination electrode with PMMA body Refillable BNC connector	Combination electrode with glass body Refillable BNC connector

Recommended uses*	
ORP8211	Oxygen reduction Potential (ORP) measurement of: • Conventional water • Wastewater • Electroplate liquid • Biological samples
I9111	• Fluoride water samples • Surface water • Drinking water • Industrial effluent
19121	• Ammonium/ammonia-containing water samples • River and lakes • Tap water • Environmental protection/sewage
19131	• Conventional sodium water samples • Water treatment • Power plant • Industrial process control

Laboratory test; for reference only.

To learn more about Agilent Electrochemistry Meters and electrodes,
or to order now, visit **www.agilent.com/chem/phmeters**

Ion Selective Electrode Specifications	19111 Fluoride Combination ISE	I9121 Ammonia Combination ISE	I9131 Sodium Combination ISE
Concentration range	Saturation: -10^{-6} mol/L Saturation: -0.02 mg/L	(10^{-1}- 10^{-6}) mol/L	Saturation: -10^{-6} mol/L
Slope (25 °C)	≥ 56 (10^{-5}-10^{-1}) mol/L	≥ 55 (10^{-5}-10^{-2}) mol/L	≥ 56 (10^{-5}-10^{-1}) mol/L
Response time	30s	180s	180s
Internal impedance	≤ 1 MΩ	≤ 1500 MΩ	≤ 250 MΩ
Reference type	Ag/AgCl	Ag/AgCl	Ag/AgCl

ORP8211 Oxidation Reduction Potential Electrode Specifications	
Measurement range	± 1999 mV
Potential accuracy	263 ± 10 mV
Reference type	Ag/AgCl
Liquid junction material	Ceramic

R8111 Reference Electrode Specifications	
Potential accuracy	± 4 mV
Internal impedance	≤ 1 kΩ
Reference type	Ag/AgCl
Liquid junction material	Ceramic
Reference filling solution	AgCl, 3 mol/L KCl

T7111 Automatic Temperature Compensation Probe	
Measuring range	(0-100) °C
Accuracy	± 0.3 °C (0-60) °C ± 1.0 °C (60-100) °C

D6111 Dissolved Oxygen Probe Specifications	
Measuring range	(0-20) mg/L
Zero oxygen current	1% FS (5 min)
Response time (90%)	30s
Temperature accuracy	± 0.5 °C

Conductivity Probe Specifications	C5111	C5112	C5113
Cell constant	1.0 ± 0.2	1.0 ± 0.2	0.1 ± 0.02
Measuring range	2-19990 µS/cm	2-3000 µS/cm	0.2-199.9 µS/cm

R8111 Reference electrode, 5190-4003

Convenient, all-in-one packages include meter, electrodes, and accessories

All-in-one Packages

Description	Recommended Use	Part No.
Agilent 3200P Benchtop pH Meter Basic Package Includes Agilent 3200P benchtop pH meter, P3211 pH combination electrode, T7111 ATC probe, pH buffer package, and Agilent 3200EA electrode holder	Stable, accurate measurement of organic solution samples in fields such as scientific research, education, and chemical analysis	G4391A
Agilent 3200P Benchtop pH Meter Package with 3-in-1 Electrode Includes Agilent 3200P benchtop pH meter, P3311 pH triode combination electrode, pH buffer package, and Agilent 3200EA electrode holder	Ordinary physical and chemical analysis in fields such as conventional water quality, education, and chemical analysis	G4392A
Agilent 3200C Benchtop Conductivity Meter Basic Package Includes Agilent 3200C benchtop conductivity meter, C5111 conductivity probe, T7111 ATC probe, and Agilent 3200EA electrode holder	Best for applications such as conventional surface water, drinking water, environmental water testing, and process analysis	G4393A
Agilent 3200C Benchtop Conductivity Meter Package for Pure Water Analysis Includes Agilent 3200C benchtop conductivity meter, C5113 conductivity probe, T7111 ATC probe, and Agilent 3200EA electrode holder	Low-conductivity sample measurement of distilled water, boiler water, and pure water in fields such as energy, pharmacy, biology, and food safety	G4394A
Agilent 3200D Benchtop Dissolved Oxygen Meter Package Includes Agilent 3200D benchtop dissolved oxygen meter, D6111 DO probe (including DO filling solution and DO membrane), and Agilent 3200EA electrode holder	DO measurement of conventional water in applications such as environmental, monitoring, aquaculture, sewage treatment, drinking water and research	G4395A
Agilent 3200I Benchtop Ion Meter Basic Package Includes Agilent 3200I benchtop ion meter, P3211 pH combination electrode, T7111 ATC probe, pH buffer package, and Agilent 3200EA electrode holder	pH measurement and ion analysis in fields such as scientific research, process analysis, biochemistry, and pharmacy (different ion, different electrode)	G4396A
Agilent 3200I Benchtop Fluoride Ion Meter Package Includes Agilent 3200I benchtop ion meter, I9111 fluoride combination ISE, T7111 ATC probe, pH buffer package, and Agilent 3200EA electrode holder	Measurement of samples such as fluoride water, surface water, drinking water, and industrial effluent	G4397A
Agilent 3200M Benchtop Multi-Parameter Analyzer Package Includes Agilent 3200M benchtop multi-parameter analyzer, P3211 pH combination electrode, C5111 conductivity probe, D6111 DO probe (including DO filling solution and DO membrane), T7111 ATC probe, pH buffer package, and Agilent 3200EA electrode holder	pH, conductivity, and DO measurement; ion analysis in a wide range of fields (different ion, different electrode)	G4398A

Every Agilent Meter is backed by our 3-year replacement guarantee.

To learn more about Agilent Electrochemistry Meters and electrodes, or to order now, visit **www.agilent.com/chem/phmeters**

Ordering Information: Meters, accessories, and packages

3200D dissolved oxygen meter, G4385A

Description	Part No.
All-in-one Packages	
Agilent 3200P Benchtop pH Meter Basic Package Includes:	**G4391A**
Agilent 3200P benchtop pH meter	G4383A
Agilent 3200EA electrode holder	G4389A
P3211 pH combination electrode, includes 30 mL reference solution	5190-3988
T7111 ATC probe	5190-3998
pH buffer solutions, 4.01, 7.00, 10.01, NIST traceable, 250 mL, 3/pk	5190-0533*
pH buffer solutions, 4.00, 6.86, 9.18, GB traceable, 250 mL, 3/pk	5190-0534**
Agilent 3200P Benchtop pH Meter Package with 3-in-1 Electrode Includes:	**G4392A**
Agilent 3200P benchtop pH meter	G4383A
Agilent 3200EA electrode holder	G4389A
P3311 pH triode combination electrode, includes 30 mL reference solution	5190-3990
pH buffer solutions, 4.01, 7.00, 10.01, NIST traceable, 250 mL, 3/pk	5190-0533*
pH buffer solutions, 4.00, 6.86, 9.18, GB traceable, 250 mL, 3/pk	5190-0534**
Agilent 3200C Benchtop Conductivity Meter Basic Package Includes:	**G4393A**
Agilent 3200C benchtop conductivity meter	G4384A
Agilent 3200EA electrode holder	G4389A
C5111 conductivity probe	5190-3994
T7111 ATC probe	5190-3998
Agilent 3200C Benchtop Conductivity Meter Package for Pure Water Analysis Includes:	**G4394A**
Agilent 3200C benchtop conductivity meter	G4384A
Agilent 3200EA electrode holder	G4389A
C5113 conductivity probe	5190-3996
T7111 ATC probe	5190-3998
Agilent 3200D Benchtop Dissolved Oxygen Meter Package Includes:	**G4395A**
Agilent 3200D benchtop dissolved oxygen meter	G4385A
Agilent 3200EA electrode holder	G4389A
D6111 DO probe, 30 mL bottle of DO filling solution	5190-3997

*Default, if not specified otherwise

**For China customers only

(Continued)

Every Agilent Meter is backed by our 3-year replacement guarantee.

Description	Part No.
All-in-one Packages	
Agilent 3200I Benchtop Ion Meter Basic Package Includes:	**G4396A**
Agilent 3200I benchtop ion meter	G4386A
Agilent 3200EA electrode holder	G4389A
T7111 ATC probe	5190-3998
pH buffer solutions, 4.01, 7.00, 10.01, NIST traceable, 250 mL, 3/pk	5190-0533*
pH buffer solutions, 4.00, 6.86, 9.18, GB traceable, 250 mL, 3/pk	5190-0534**
P3211 pH combination electrode, includes 30 mL reference solution	5190-3988
Agilent 3200I Benchtop Fluoride Ion Meter Package Includes:	**G4397A**
Agilent 3200I benchtop ion meter	G4386A
Agilent 3200EA electrode holder	G4389A
T7111 ATC probe	5190-3998
I9111 fluoride combination ISE, includes 30 mL reference solution	5190-4002
Agilent 3200M Benchtop Multi-Parameter Analyzer Package Includes:	**G4398A**
Agilent 3200M benchtop multi-parameter analyzer	G4387A
Agilent 3200EA electrode holder	G4389A
P3211 pH combination electrode, includes 30 mL reference solution	5190-3988
T7111 ATC probe	5190-3998
pH buffer solutions, 4.01, 7.00, 10.01, NIST traceable, 250 mL, 3/pk	5190-0533*
pH buffer solutions, 4.00, 6.86, 9.18, GB traceable, 250 mL, 3/pk	5190-0534**
D6111 DO probe, 30 mL bottle of DO filling solution	5190-3997
C5111 conductivity probe	5190-3994

*Default, if not specified otherwise

**For China customers only

Electrochemistry Meters*

Description	Part No.
Agilent 3200P benchtop pH meter	G4383A
Agilent 3200C benchtop conductivity meter	G4384A
Agilent 3200D benchtop dissolved oxygen meter	G4385A
Agilent 3200I benchtop ion meter	G4386A
Agilent 3200M benchtop multi-parameter analyzer	G4387A
Accessories	
Agilent 3200SA stirrer	G4388A
Agilent 3200EA electrode holder	G4389A

*EC Print software for easy and direct printing and EC Firmware software are available for free download at www.agilent.com/chem/phmeters

3200SA stirrer, G4388A

Every Agilent Meter is backed by our 3-year replacement guarantee.

To learn more about Agilent Electrochemistry Meters and electrodes, or to order now, visit **www.agilent.com/chem/phmeters**

Ordering Information: Electrodes, chemicals, and parts

P3211 pH combination electrode, 5190-3988

P3212 pH combination electrode, 5190-3989

P3311 pH triode combination electrode, 5190-3990

P3111 pH electrode, 5190-3991

P3213 pH combination electrode, 5190-3992

P3214 pH combination electrode, 5190-3993

C5111 Conductivity probe, 5190-3994

C5112 Conductivity probe, 5190-3995

C5113 Conductivity probe, 5190-3996

D6111 DO probe, 5190-3997

Electrodes*

Description	Kit Contents	Part No.
P3211 pH combination electrode	Includes 30 mL reference solution	5190-3988
P3212 pH combination electrode		5190-3989
P3311 pH triode combination electrode	Includes 30 mL reference solution	5190-3990
P3111 pH electrode		5190-3991
P3213 pH combination electrode	Includes 30 mL reference solution	5190-3992
P3214 pH combination electrode		5190-3993
C5111 conductivity probe		5190-3994
C5112 conductivity probe		5190-3995
C5113 conductivity probe		5190-3996
D6111 DO probe	Includes 30 mL DO Filling Solution	5190-3997
T7111 ATC probe		5190-3998
ORP8211 ORP electrode	Includes 30 mL reference solution	5190-3999
R8111 reference electrode	Includes 30 mL reference solution	5190-4003
I9111 fluoride combination ISE	Includes 30 mL reference solution	5190-4002
I9121 ammonia combination ISE	Includes 30 mL reference solution	5190-4004
I9131 sodium combination ISE	Includes 30 mL reference solution	5190-4005

*All electrodes ship with a certificate of conformance and the certificate is also available online in the literature library.

Every Agilent Meter is backed by our 3-year replacement guarantee.

7T111 ATC probe, 5190-3998

ORP8211 ORP electrode, 5190-3999

R8111 Reference electrode, 5190-4003

I9111 Fluoride combination ISE, 5190-4002

I9121 Ammonia combination ISE, 5190-4004

I9131 Sodium combination ISE, 5190-4005

Please see page 14 for electrode recommended uses.

Agilent reference and filling solutions

B620 stirring bar,
G4388-27000

Ammonia electrode membrane,
5190-0543

Chemicals*

Description	Amount	Part No.
pH buffer solutions, 4.01, 7.00, 10.01, NIST traceable	3 x 250 mL	5190-0533
pH buffer solutions, 4.00, 6.86, 9.18, GB traceable	3 x 250 mL	5190-0534
pH buffer, 4.01	3 x 250 mL	5190-0535
pH buffer, 10.01	3 x 250 mL	5190-0536
pH buffer, 7.00	3 x 250 mL	5190-0537
pH buffer, 4.00	3 x 250 mL	5190-0538
pH buffer, 6.86	3 x 250 mL	5190-0539
pH buffer, 9.18	3 x 250 mL	5190-0540
Ammonia electrode membrane, 5 pieces		5190-0543
Ammonia Reference Solution	3 x 30 mL	5190-0544
Reference solution, pH	3 x 30 mL	5190-0545
Sodium ISE Reference Solution	3 x 30 mL	5190-0546
DO filling solution	3 x 30 mL	5190-0547
DO membrane sleeve, 3 pieces	3 pieces	5190-0548
Accessories		
Power adapter, E15WCP1-090100SPA		5185-8389
B620 stirring bar		G4388-27000
BNC-50J short circuit plug		G4383-40000
ATC temperature diagnostic tool		5185-8390
Conductivity diagnostic tool		5185-8391

*Certificates of analysis ship with this product and are also available online in the literature library.

Every Agilent Meter is backed by our 3-year replacement guarantee.

Power adapter,
5185-8389

BNC-50J short circuit plug,
G4383-40000

ATC temperature diagnostic tool,
5185-8390

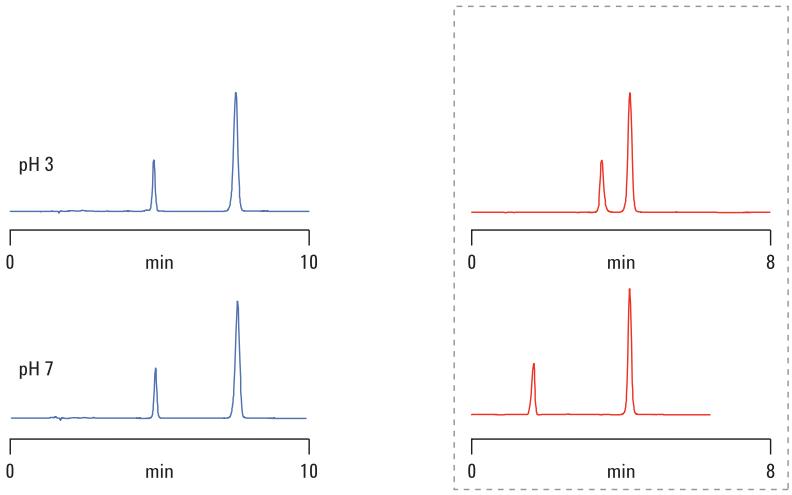
Conductivity diagnostic tool,
5185-8391

To learn more about Agilent Electrochemistry Meters and electrodes,
or to order now, visit **www.agilent.com/chem/phmeters**

pH Management:
A key to confident chromatography

Mobile phase pH can impact the selectivity, peak shape, and retention of your chromatography, as you will see in the chromatogram series below.

NEUTRAL	IONIZABLE
Naphthalene Acenaphthene	Benzoic acid Benzanilide



The effect of pH on resolution

Left:

Neutral samples were run at pH 3 and 7. Note that there is little difference between the chromatograms.

Right:

Here you can see that ionizable compounds (acids and bases) can significantly change retention and selectivity with changes in pH.

Always consider your detector when choosing a mobile phase modifier. Modifiers that work well with UV detectors may not be compatible with MS detectors.

Selecting the right mobile phase modifier for UV detectors

Your choice of mobile phase modifier (buffer) can have a strong influence on your detector. For UV detectors, the buffer should be effectively transparent at the wavelength of interest, which is why buffers with UV cutoffs (below 220 nm) work best.

Special considerations for LC/MS

When working with MS detectors that have LC/MS ionization sources, it is critical to exclude non-volatile materials from your mobile phase, (and sometimes your sample as well). This will prevent ionization source fouling as the mobile phase is nebulized and partially dried in the source.

Five tips for pH management

1. Non-ionized analytes have better retention than ionized analytes. Choose a low pH buffer for acids and a high pH buffer for bases (if feasible).
2. Silanols on silica ionize at mid pH, increasing the retention of basic analytes and the likelihood of ion exchange interactions. Acidic mobile phases are best for separating ionizable compounds by reversed phase chromatography.
3. Choose a mobile phase pH that optimizes retention and selectivity.
4. Avoiding extreme pH values (either very high or very low) lengthens column life. Buffers can help maintain a consistent pH, improving reproducibility. If your method requires pH-extremes, the Agilent 1260 Infinity Bio-inert LC system might be a good choice – it is specified for pH 1-13 (short term 14).
5. ZORBAX Eclipse Plus HPLC columns can be used over a wide pH range (2-9). For high pH, start with Extend-C18 or polymeric phases; for low pH, use StableBond or polymeric phases.

To learn more about Agilent Electrochemistry Meters and electrodes, or to order now, visit **www.agilent.com/chem/phmeters**

Agilent's pH Meter family reflects our ongoing commitment to simplifying method development

Leading the way toward infinitely better chromatography

From "workhorse" LC systems for routine analysis to sophisticated, high-resolution LC/MS instruments, Agilent's 1200 Infinity Series combines uncompromised UHPLC performance with a modular design for easy customization.

Setting the pace for fast LC and easy method transfer

Agilent Poroshell 120 and 300 columns give you speed and resolution that are comparable to sub-2 µm columns – with up to 50% less backpressure, so you can get more from every LC instrument.

Agilent ZORBAX Rapid Resolution High Definition (RRHD) columns are the only columns stable to 1200 bar for ultimate speed and resolution.

You can also count on simple method transfer and scalability, because ZORBAX RRHD, Poroshell 120 and 300 columns seamlessly scale to the entire ZORBAX family.

Keeping you in command of your analyses

Agilent's meticulous production oversight ensures column and sample prep consistency. With more than 40 years of experience producing polymers and silica chemistries, our team is committed to continuously developing advances that make your more productive.

For more information

Learn more
www.agilent.com/chem/phmeters

U.S. and Canada
agilent_inquiries@agilent.com
1-800-227-9770

Europe
Info_agilent@agilent.com

Asia Pacific
Inquiry_lsca@agilent.com

Printed in USA July 2, 2012
5991-0122EN