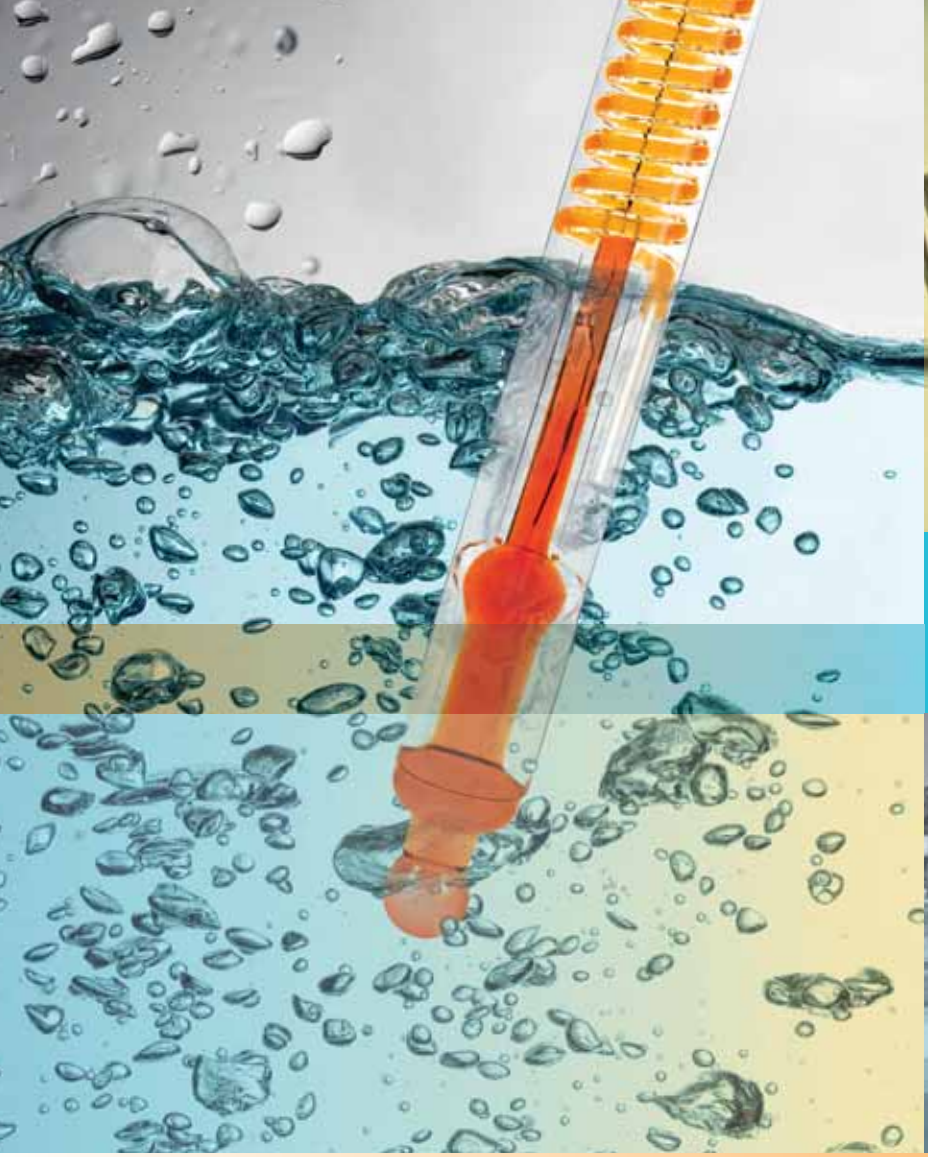




2012 Thermo Scientific Orion®
Laboratory Products Catalog



thermo scientific orion

laboratory products catalog

• pH • ISE • Dissolved Oxygen • Conductivity • Colorimetry • Turbidity

Thermo
SCIENTIFIC

What's New!

Unveil a whole new line of Orion products

With over 50 years of innovation and proven performance, Thermo Scientific Orion products provide you a full range of laboratory and on-line water analysis instruments serving markets such as environmental, water and wastewater, power, food and beverage, pharmaceutical and general laboratory.

In this catalog, you will find a comprehensive selection of meters, analyzers, electrodes and solutions that are recognized worldwide and will provide you the security that your quality standards are met.

For a start, here's a little sneak preview.



Versatility

The meter for today's needs and tomorrows challenges. The Expandable modular Orion VERSA STAR design gives you the flexibility you need. Starting on page 4.

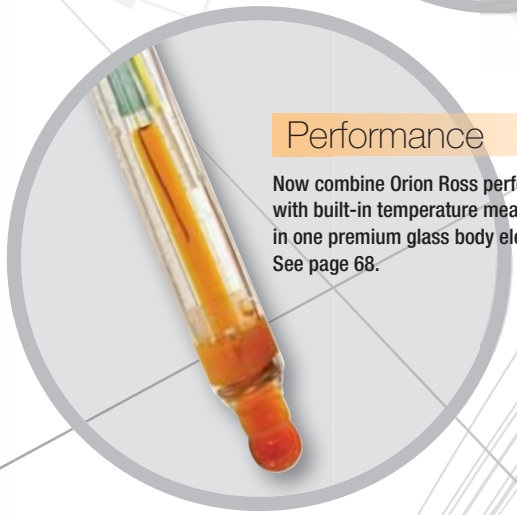
We have the perfect meter for your application.



Durability

Now more than ever, the Orion line meets requirements for field applications. The Star A meter kits include robust cases and complete accessories. Starting on page 40.





Performance

Now combine Orion Ross performance with built-in temperature measurement in one premium glass body electrode. See page 68.



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Water Quality Specialist Tip

The following icons are designed to help you locate the best product for your application.

Best, Better, Good
Electrode ratings based on the electrode precision

Best Seller
Our most popular customer products

TRIS Compatible
pH electrodes for use with TRIS, protein and sulfide samples (calomel replacements)

Superior Temperature Control
pH electrodes that respond exceptionally well to sample temperature changes

Lead-Free
Environmentally safe electrodes that use lead-free glass, which exceeds the requirements of RoHS

Compliant with EPA testing methods

Compliant with USP requirements

Hazardous Materials
Additional shipping charges may apply



Introducing the latest Thermo Scientific Orion Star Meters

Orion VERSA STAR and Star A Meters

The new Orion Star™ A and VERSA STAR™ meters are built on the quality and expertise you've come to expect from the Orion product line. The expanded offering combines the tried-and-true features relied on by many professionals with new features concentrated on making them easier to use and minimizing the time needed to train others or to refer to instructions.



Orion VERSA STAR Benchtop Series

The Orion VERSA STAR advanced benchtop meter and modules exemplify versatility. Four channels can be configured in any combination. Define the channels as you need them. Some suggestions are: four different parameters for complete multiparameter analysis, two sets of two different parameters for simultaneous dual-parameter testing or even four of the same for really high throughput. The versatility also shows in the large, customizable color display; ability to handle the testing spectrum from simple readings to advanced ISE applications; redesigned electrode holder head and exclusive auto-recognition capability for Orion optical RDO and polarographic DO probes. Orion VERSA STAR meters have all the best features and options to work with any application, even the unexpected.

Orion Star A320 and A200-series meters offer dependability and are an easy choice if you need a dedicated single or multiparameter meter for accurate and repeatable measurements every day. Built with the testing location in mind, the benchtop meters feature an Orion Star stirrer probe port and include the redesigned electrode holder head. The portable meters are waterproof with an IP67-rated housing and have the option to accept AC power. The large, backlit graphic display shows results with plain language prompts. Exclusive auto-recognition capability for Orion optical RDO and polarographic DO probes lets you choose the best probe for your application, not limiting your probe options. These meters are the ideal choice for any lab, for every sample, every day.

Orion Star A320 & A200 Series



To complement the new meters, we've kept our specialized, industry-proven meters. The Orion DUAL STAR meters are easy-to-use with two channels for simultaneous measurement. For environments that need non-sparking meters, the Orion Intrinsically-Safe Meters meet that criteria and are US intrinsically-safe rated.

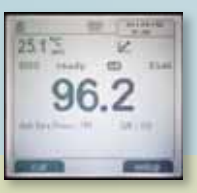
Our 2012 Orion meter offering means no more settling for a meter – get the right fit for your application and testing needs.

Orion Star A100 Series



For simplicity and affordability without sacrificing accuracy, look no further than the Orion Star A100-series meters. These single parameter meters are available in benchtop and portable housings. The simple keypad layout combined with the dedicated onscreen messages help with calibration and setup. Orion Star A100-series meters provide just the core information you need.

Housing	Benchtop			
Model	**Orion VERSA STAR**	**Orion DUAL STAR**	**Orion Star A210-Series**	**Orion Star A110-Series**
Parameter	**Catalog Numbers**			
pH	**Meter Set:** VSTAR10, VSTAR40A, VSTAR40B, VSTAR50, VSTAR80, VSTAR90, VSTAR91 **Kit:** VSTAR12, VSTAR40A2, VSTAR40B2, VSTAR52, VSTAR82, VSTAR92, VSTAR93	**Meter:** 2115000 **Kit:** 2115001, 2115101, 2115102	**Meter:** STARA2110, STARA2140, STARA2150, STARA2160 **Kit:** STARA2115, STARA2116, STARA2145, STARA2155, STARA2165	**Meter:** STARA1110 **Kit:** STARA1115, STARA1116
ISE	**Meter Set:** VSTAR40A, VSTAR40B, VSTAR90, VSTAR91 **Kit:** VSTAR40A2, VSTAR40B2, VSTAR92, VSTAR93	**Meter:** 2115000 **Kit:** 2115001, 2115101, 2115102	**Meter:** STARA2140 **Kit:** STARA2145, STARA2146, STARA2147, STARA2148	
Conductivity/TDS	**Meter Set:** VSTAR20, VSTAR50, VSTAR90, VSTAR91 **Kit:** VSTAR22, VSTAR52, VSTAR92, VSTAR93		**Meter:** STARA2120, STARA2150 **Kit:** STARA2125, STARA2126, STARA2155	**Meter:** STARA1120 **Kit:** STARA1125
Resistivity/Salinity				
RDO	**Meter Set:** VSTAR30, VSTAR90, VSTAR91 **Kit:** VSTAR32, VSTAR92, VSTAR93		**Meter:** STARA2130, STARA2160 **Kit:** STARA2135, STARA2136, STARA2165	
DO				**Meter:** STARA1130 **Kit:** STARA1135
pH/ISE/Conductivity/RDO/DO	**Meter Set:** VSTAR90, VSTAR91 **Kit:** VSTAR92, VSTAR93			
Number of Channels	1 to 4	2	1 to 2	1
Orion Star Stirrer Probe Control	2	1	1	
Datalog	2000 with date/time	1000 with date/time	2000 with date/time	50
USB Output	2	1	1	
RS232 Output	1	1	1	
Methods	10 per channel	10 per channel	10	
Example Display				
Page Numbers	4-9, 14-15, 20-21, 26-27, 32-33, 38	10-11	12-13, 16-19, 22-23, 28-29, 34-35	24-25, 30-31, 36-37

Housing	Portable			
Model	**Orion Star A320-Series**	**Orion Star A220-Series**	**Orion Star A120-Series**	**Orion Intrinsically Safe**
Parameter	**Catalog Numbers**			
pH	**Meter:** STARA3210, STARA3240, STARA3250, STARA3260, STARA3290 **Kit:** STARA3215, STARA3245, STARA3255, STARA3265, STARA3295	**Meter:** STARA2210 **Kit:** STARA2215	**Meter:** STARA1210 **Kit:** STARA1215	**Meter & Electrode:** 0261S0, 0266S0 **Kit:** 0261S3, 0266S3
ISE	**Meter:** STARA3240, STARA3290 **Kit:** STARA3245, STARA3295			
Conductivity/TDS	**Meter:** STARA3220, STARA3250, STARA3290 **Kit:** STARA3225, STARA3255, STARA3295	**Meter:** STARA2220 **Kit:** STARA2225	**Meter:** STARA1220 **Kit:** STARA1225	**Meter & Electrode:** 0131S0, 0136S0 **Kit:** 0131S3, 0136S3
Resistivity/Salinity				
RDO	**Meter:** STARA3230, STARA3260, STARA3290 **Kit:** STARA3235, STARA3265, STARA3295	**Meter:** STARA2230 **Kit:** STARA2235		
DO			**Meter:** STARA1230 **Kit:** STARA1235	
pH/ISE/Conductivity/RDO/DO	**Meter:** STARA3290 **Kit:** STARA3295			
Number of Channels	1 to 3	1	1	1
Datalog	5000 with date/time	1000 with date/time	50	100 with date/time on select meters
USB Output	1	1		
RS232 Output	1	1		1
Methods	10			
Example Display				
Page Numbers	40-49, 52-53, 56-57	48-49, 52-53, 56-57	50-51, 54-55, 58	61

Meter configurations include the meter. Meter Set configurations apply to the Orion VERSA STAR and include the meter and appropriate module(s) for the measuring parameter(s). Kit configurations include meter (meter set for Orion VERSA STAR) with related electrode/probes, accessories and solutions.



Thermo Scientific Orion VERSA STAR

Advanced Electrochemistry Meter



Four channels to mix and match in any combination as you need

Visible indicators to quickly show how each of the four channels are assigned

The large, color graphic display is easy on the eyes and can be seen from any angle

Calibration information with buffer points and electrode slope from last calibration

Display information can be customized to show only the information you need

Function keys that update depending on your screen and shortcut keys on the keypad make this meter easy for anyone to use

More BIG surprises just for you! Find out on the following pages.

This versatile meter has a large, color graphic LCD display. The informative (and customizable) display shows readings, connections, time, date, sample ID, user ID and calibration information.

Features and Benefits

- Select from five modules to customize the four channels your way – it's versatile for you to configure how you need it for now or for later
- Anyone can use this meter with its plain language screen prompts, function keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Non-volatile memory holds up to 2000 data points with time and date stamp
- Memory for up to 10 methods per channel allow for customized procedures to differentiate between tests and/or users
- Data transfer and updating meter software is easy with two USB and RS232 ports
- Includes data analysis software for transferring stored results or displaying readings in real-time
- Mix samples without a stir plate with direct control for two Orion Star stirrer probes (096019, sold separately)
- Included electrode arm and newly-designed probe holder make it easier to maintain and place probes into samples
- Works with almost every AC power source with the included universal power adapter
- IP54-rated housing handles splashes
- 3 year meter replacement warranty



A variety of modules that you can place in any of the four channels.

- **pH/Temperature Module Allows:**
  - Up to 6 point pH calibration with automatic recognition for USA/NIST and DIN buffers
  - Fixing of calibration errors without a complete recalibration with calibration editing
- **Use the pH/ISE/Temperature Module for:**
  - All the benefits of the pH module
  - Fixing pH/ISE calibration errors without a complete recalibration with calibration editing
  - Advanced ISE benefits such as auto-blank, timed end point, linear point-to-point, non-linear selectable auto-blank, low-concentration range stability, ISE ID and incremental techniques
- **Conductivity/Temperature Module Offers:**
  - Conductivity, TDS, salinity or resistivity capabilities
  - Selectable reading reference temperatures of 5, 10, 15, 20 or 25 ºC with linear, non-linear, nLFu or USP/EP curve options for conductivity
  - Choice of practical salinity or natural sea water curves for salinity readings
  - Linear or ISO/EN 27888 curves for TDS
- **Dissolved Oxygen/RDO/Temperature Module:**
  - Takes the worry out of DO probe compatibility – the meter accepts and automatically recognizes Orion polarographic and RDO optical/luminescence-based probes
  - Compensates automatically for temperature, salinity with manual input and barometric pressure (automatic or manual)
  - Allows for calibration using water-saturated air, air-saturated water, a Winkler titration or zero point
  - Calculates BOD/DOUR/SOUR readings when combined with the complimentary data analysis software
- **Module Featuring LogR Technology:**
  - Includes all of the features of the pH module with the added benefits of:
    - The most advanced electrode diagnostics
    - No temperature sensor needed to get temperature-compensated pH readings



Orion VERSA STAR meters are about versatility, even with accessories. Shown here – the electrode arm can be attached on either side.



Orion VERSA STAR meters can be configured a variety of ways at any time. This example shows a meter with the pH/LogR module and a pH/ISE module.



No need to turn off your meter to switch modules – meter automatically recognizes module changes.



Thermo Scientific Orion VERSA STAR 90 and 91

pH/ISE/Conductivity/RDO/Dissolved Oxygen Benchtop Meters

Looking for the top-of-the-line, best meter you can find? Looking for something for everything and meeting all those testing needs? Whether it's one sample that needs a variety of testing or a variety of samples needing one test, the Orion VERSA STAR 90 and 91 advanced multiparameter meters are ready for the job. These meters come fully-loaded and ready to take on multiple measurements.

Highlighted Features Include:

- Display customization to show only the information you need
- Plain language screen prompts, function keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese make it easy for anyone to use this meter
- Non-volatile memory that holds up to 2000 data points with time and date stamp
- Stores up to 10 methods per channel allow for customized procedures to differentiate between tests and/or users
- Two USB and a RS232 port makes for easy data transfer and updating meter software
- Complimentary data analysis software for easy transferring of stored results, real-time viewing and calculation of BOD, DOUR and SOUR results
- Option to control sample mixing directly from the meter without a separate stir plate when using with the Orion Star stirrer probe
- Increase your productivity – two stirrer probe ports allow for simultaneous stirring and control for two separate samples at the same time
- Included electrode arm and newly-designed probe holder make it easier to maintain and place probes into samples
- Working with almost every AC power source through the included universal power adapter
- IP54-rated housing handles splashes and cleans up easily
- 3 year meter replacement warranty

Product Specifications – Orion VERSA STAR Meter

		CE | TUV | EPA
Maximum Number of Modules		4
Methods		Up to 10
Datalogging	**Number of Datalogs**	2000 with time and date stamp
	Log Function	Manual, AUTO-READ™, timed interval, single timed reading
Communication Ports		One RS232, two USB ports (one client, one host)
Orion Star Stirrer Probe Ports		2
Power		Universal, AC power adapter, 90-260 VAC, 50-60 Hz

Product Specifications – pH/ISE Module (VSTAR-ISE)

		CE | TUV | EPA
pH	**Range**	-2.000 to 20.000
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	±0.002
	Calibration Points	Up to 6
	Calibration Editing	Yes
	Adjustable ISO Point	Yes
mV/Rel mV/ ORP	**Range**	±2000.0 mV
	Resolution	0.1
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	E_H ORP Mode	Yes
ISE	**Range**	0 to 19999
	Resolution	Up to 4 significant digits
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	Units	ppm, M, mg/L, %, ppb, none
	Calibration Points	Up to 6
	Calibration Editing	Yes
	Adjustable ISO Point	Yes
	Calibration Features	Timed end point, linear point to point, non-linear selectable auto-blank, low concentration range stability
	Incremental Techniques	Single known addition & subtraction, double known addition & subtraction, single analate addition & subtraction
	Advanced Features	Displays electrode type, temperature compensation
Temperature	**Range**	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Inputs	**pH/ISE**	BNC, reference pin
	ATC	8-pin mini-DIN

Product Specifications – Conductivity Module (VSTAR-CND)

		CE | TUV | EPA
Conductivity	**Range**	0.001 µS to 3000 mS
	Resolution	0.001 µS minimum; 4 significant figures minimum
	Relative Accuracy	0.5 % reading ±1 digit
	Reference Temperature	5, 10, 15, 20, 25 °C
	Temperature Compensation	Linear (0 to 10.0 %/°C), nLn, nLFu, USP/EP
	Compatible Cell Constants	0.001 to 199.9
	Calibration Points	Up to 6 points
	Calibration Editing	Yes

Resistivity	**Range**	2 ohm to 100 meg-ohm
	Resolution	2 ohms-cm
	Relative Accuracy	0.5 % reading ±1 digit
Salinity	**Type**	Practical salinity or natural sea water
	Range	0.01 to 80.0 ppt NaCl equivalent; 0.01 to 42 ppt sea water
	Resolution	0.01
	Relative Accuracy	±0.1
TDS	**Range**	0 to 200 ppt
	Resolution	4 significant digits
	Relative Accuracy	±0.5 % reading ±1 digit
	TDS Factor Range	Linear 0.01 to 10.00
Temperature	**Range**	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Input		8-pin mini-DIN

Product Specifications – RDO/DO Module (VSTAR-RD)

		CE | TUV | EPA
Dissolved Oxygen	**Concentration - Polarographic**	
	Range	0 to 90 mg/L
	Resolution	0.01, 0.1
	Relative Accuracy	±0.2
	% Saturation - Polarographic	
	Range	0 to 600
	Resolution	0.1, 1
	Relative Accuracy	±2 %
	Concentration - RDO	
	Range	0 to 50 mg/L
	Resolution	0.01, 0.1
	Relative Accuracy	±0.1 mg/L up to 8 mg/L; ±0.2 mg/L from 8 to 20 mg/L; 10 % of reading, 20 to 50 mg/L
	% Saturation - RDO	
	Range	0 to 500
	Resolution	0.1, 1
	Relative Accuracy	±2 %
	Automatic Barometric Pressure Correction	450.0 to 850.0 mm Hg
	Salinity Factor Correction	Automatic when used with conductivity module and probe or manual; 0 to 45 ppt
	Calibration Features	Water saturated air, air saturated water, manual (Winkler) and zero point
	Probe Type	Polarographic or RDO
Temperature	**Range**	0 to 50 °C, 32 to 122 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Input		9-pin mini-DIN

Meter Ordering Information

Cat. No.	Description
VSTAR90	**Orion VERSA STAR pH/ISE/Conductivity/RDO/Dissolved Oxygen Benchtop Multiparameter Meter Set** - Orion VERSA STAR meter - Orion VERSA STAR pH/ISE/temperature module - Orion VERSA STAR conductivity/temperature module - Orion VERSA STAR dissolved oxygen/ temperature module - Electrode arm with redesigned holder - Universal power adapter
VSTAR91	**Orion VERSA STAR pH/ISE/Conductivity/RDO/Dissolved Oxygen Ultimate Benchtop Multiparameter Meter Set** - Orion VERSA STAR meter - Two Orion VERSA STAR pH/ISE/temperature modules - Orion VERSA STAR conductivity/temperature module - Orion VERSA STAR dissolved oxygen/ temperature module - Two 096019 Orion Star stirrer probes - Two electrode arms with redesigned holders - Universal power adapter
VSTAR92	**Orion VERSA STAR pH/ISE/Conductivity/RDO/Dissolved Oxygen Benchtop Multiparameter Meter Kit** - Orion VERSA STAR meter - Two Orion VERSA STAR pH/ISE/temperature modules - Orion VERSA STAR conductivity/temperature module - Orion VERSA STAR dissolved oxygen/ temperature module - 8157BNUMD Orion ROSS Ultra Triode pH/ATC probe - 013005MD Orion DuraProbe conductivity cell, K=0.475 - 083005MD Orion polarographic DO probe - 096019 Orion Star stirrer probe - 080017 calibration sleeve for DO probe - 080513 DO probe maintenance kit - 970802 BOD funnel/stirrer - 080360 BOD adapter - 810199 ROSS solution kit (475 mL each of pH 4, 7 and 10 buffers; storage solution; cleaning solution; and pH electrode storage bottle) - 011007 conductivity standard, 1413 µS, 5 x 60 mL - Electrode arm with redesigned holder - Universal power adapter
VSTAR93	**Orion VERSA STAR pH/ISE/Conductivity/RDO/Dissolved Oxygen Ultimate Benchtop Multiparameter Meter Kit** - Orion VERSA STAR meter - Two Orion VERSA STAR pH/ISE/temperature modules - Orion VERSA STAR conductivity/temperature module - Orion VERSA STAR dissolved oxygen/ temperature module - 8157BNUMD Orion ROSS Ultra Triode pH/ATC probe - 013005MD Orion DuraProbe conductivity cell, K=0.475 - 083005MD Orion polarographic DO probe - Two 096019 Orion Star stirrer probes - 080017 calibration sleeve for DO probe - 080513 DO probe maintenance kit - 970802 BOD funnel/stirrer - 080360 BOD adapter - 810199 ROSS solution kit (475 mL each of pH 4, 7 and 10 buffers; storage solution; cleaning solution; and pH electrode storage bottle) - 011007 conductivity standard, 1413 µS, 5 x 60 mL - Two electrode arms with redesigned holders - Universal power adapter



pH
ISE
ORP
Cond
RDO
DO
Temp



Thermo Scientific Orion VERSA STAR 40

pH/ISE Benchtop Meters

Measuring pH/ISE has never looked so good or been so easy. The large color display is easy on to read and easy on the eyes. Prompts make accuracy and repeatability easy for even the most complicated testing. If you need to add more channels for more or obtain more parameters from the same, simply remove the protective individual channel cover and add the new module.

Features and Benefits

- Versatility is the name of the game
  - Change out modules to create the meter you need at any time
  - Customize the display to show only the information you need
- Up to 6 point pH calibration with automatic recognition for USA/NIST and DIN buffers and electrode identification
- This meter features advanced ISE capabilities to work with all ISE testing applications, even the most complex
  - Up to 6 point ISE calibration with timed end point and point-to-point or linear regression slope
  - Non-linear selectable auto-blank and low-concentration range stability
  - Incremental techniques for known or analyte addition and subtraction
  - Adjustable isopoint for temperature-compensated ISE results
- Fix errors without a complete recalibration with the calibration editing function
- Anyone can use this meter with its plain language screen prompts, function keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen, ready indicator alerts when readings are stable and timed reading gathers data in specific time intervals or just once with single-shot mode
- Non-volatile memory holds up to 2000 data points with time and date stamp
- Stores up to 10 methods per channel allow for customized procedures to differentiate between tests and/or users
- Two USB and a RS232 port makes for easy data transfer and updating meter software
- Includes data analysis software for easy transferring of stored results or real-time viewing
- Increase your productivity – two Orion Star stirrer probe ports allow for simultaneous stirring and control for two separate samples at the same time
- Included electrode arm and newly-designed probe holder make it easier to maintain and place probes into samples
- Works with almost every AC power source through the included universal power adapter
- IP54-rated housing handles splashes and cleans up easily
- 3 year meter replacement warranty

Product Specifications – Orion VERSA STAR Meter

		CE | TUV | EPA
Maximum Number of Modules		4
Methods		Up to 10
Datalogging	**Number of Datalogs**	2000 with time and date stamp
	Log Function	Manual, AUTO-READ™, timed interval, single timed reading
Communication Ports		One RS232, two USB ports (one client, one host)
Orion Star Stirrer Probe Ports		2
Power		Universal, AC power adapter, 90-260 VAC, 50-60 Hz

Product Specifications – pH/ISE Module (VSTAR-ISE)

		CE | TUV | EPA
pH	**Range**	-2.000 to 20.000
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	±0.002
	Calibration Points	Up to 6
	Calibration Editing	Yes
	Adjustable ISO Point	Yes
mV/Rel mV/ ORP	**Range**	±2000.0 mV
	Resolution	0.1
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	E_H ORP Mode	Yes
ISE	**Range**	0 to 19999
	Resolution	Up to 4 significant digits
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	Units	ppm, M, mg/L, %, ppb, none
	Calibration Points	Up to 6
	Calibration Editing	Yes
	Adjustable ISO Point	Yes
	Calibration Features	Timed end point, linear point to point, non-linear selectable auto-blank, low concentration range stability
	Incremental Techniques	Single known addition & subtraction, double known addition & subtraction, single analate addition & subtraction
	Advanced Features	Displays electrode type, temperature compensation
Temperature	**Range**	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Inputs	**pH/ISE**	BNC, reference pin
	ATC	8-pin mini-DIN



That's not all.
We have more to show you.

Meter Ordering Information

Cat. No.	Description
VSTAR40A	**Orion VERSA STAR pH/ISE Benchtop Meter Set** - Orion VERSA STAR meter - Orion VERSA STAR pH/ISE/temperature module - Electrode arm with redesigned holder - Universal power adapter
VSTAR40A2	**Orion VERSA STAR pH/ISE Benchtop Meter Kit** - Orion VERSA STAR meter - Orion VERSA STAR pH/ISE/temperature module - 8102BNUWP Orion ROSS Ultra pH electrode - 096019 Orion Star stirrer probe - 927007MD ATC probe, stainless steel - ROSS solution kit (475 mL each of pH 4, 7 and 10 buffers; storage solution; cleaning solution; and pH electrode storage bottle) - Electrode arm with redesigned holder - Universal power adapter
VSTAR40B	**Orion VERSA STAR Benchtop Meter with Two pH/ISE Modules Set** - Orion VERSA STAR meter - Two Orion VERSA STAR pH/ISE/temperature modules - Electrode arm with redesigned holder - Universal power adapter
VSTAR40B2	**Orion VERSA STAR Benchtop Meter with Two pH/ISE Modules Kit** - Orion VERSA STAR meter - Two Orion VERSA STAR pH/ISE/temperature modules - 8102BNUWP Orion ROSS Ultra pH electrode - 096019 Orion Star stirrer probe - 927007MD ATC probe, stainless steel - ROSS solution kit (475 mL each of pH 4, 7 and 10 buffers; storage solution; cleaning solution; and pH electrode storage bottle) - Two electrode arms with redesigned holders - Universal power adapter



Accessories

Cat. No.	Description
VSTAR-PH	Orion VERSA STAR pH/temperature module
VSTAR-ISE	Orion VERSA STAR pH/ISE/temperature module
VSTAR-CND	Orion VERSA STAR conductivity/temperature module
VSTAR-RD	Orion VERSA STAR RDO/DO/temperature module
VSTAR-LR	Orion VERSA STAR pH/temperature with LogR technology module
STARA-BEA	Benchtop electrode arm for Orion Star A-series meters
STARA-HB	Freestanding base for use with Orion Star A-series benchtop electrode arm
STARA-PWR	Replacement universal power adapter for Orion VERSA STAR meters
096019	Orion Star stirrer probe
8102BNUWP	Orion ROSS Ultra pH electrode, refillable, glass body
8172BNWP	Orion ROSS Sure-Flow pH electrode, glass body
8156BNUWP	Orion ROSS Ultra refillable pH electrode, epoxy body
8157BNUMD	Orion ROSS Triode pH/ATC electrode, refillable, epoxy body
8302BNUMD	Orion ROSS Triode pH/ATC electrode, refillable, glass body
8611BNWP	Orion ROSS sodium combination ISE
927007MD	Orion ATC probe, stainless steel body
927005MD	Orion ATC probe, epoxy body
013005MD	Orion DuraProbe conductivity cell, 4-cell, K=0.475
013016MD	Orion conductivity cell, flow through, K=0.1
083005MD	Orion dissolved oxygen probe, polarographic
086030MD	Orion auto-stir DO/BOD probe, polarographic
087010MD	Orion RDO optical DO probe, 3 m cable
810199	Orion ROSS all-in-one pH buffer kit
910104	Orion pH 4.01 buffer, 475 mL
910107	Orion pH 7.00 buffer, 475 mL
910110	Orion pH 4.01 buffer, 475 mL
011008	Orion conductivity standard, 100 µS/cm, 5 x 60 mL bottles
011007	Orion conductivity standard, 1413 µS/cm, 5 x 60 mL bottles
011006	Orion conductivity standard, 12.9 mS/cm, 5 x 60 mL bottles
1010001	Orion conductivity calibration resistor kit
9512HPBNWP	Orion high-performance ammonia ISE
9512BNWP	Orion standard ammonia ISE
951007	Ammonia standard, 1000 ppm, 475 mL
951210	Low-level ammonia ISA
951211	Ammonia ISA, 475 mL
951209	Fill solution for Orion high-performance ammonia ISE, 60 mL
951202	Fill solution for standard ammonia ISE , 60 mL
951213	Ammonia ISE storage solution
9609BNWP	Orion fluoride combination ISE
040906	Fluoride standard, 1 ppm with TISAB II, 475 mL
040907	Fluoride standard, 2 ppm with TISAB II, 475 mL
040908	Fluoride standard, 10 ppm with TISAB II, 475 mL
940909	TISAB II, 1 gallon
8611BNWP	Orion ROSS sodium combination ISE

pH
ISE
ORP
Cond
RDO
DO
Temp



Thermo Scientific Orion DUAL STAR™

Dual Channel pH/ISE Benchtop Meter



Display shows results, electrode status, ATC temperature and channel settings. If a method is selected, the number shows as well

Power key turns on/off the meter and adjusts backlighting

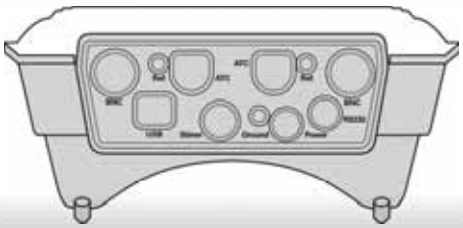
Shortcut keys for direct access to commonly used functions

Channel key toggles display to show both channels simultaneously or just one

Single channel display also shows electrode serial number, sample ID, date and time

Function keys update according to the menu for easy selection

Numeric keypad for easy data entry in submenus



Features and Benefits

- Dual channel with simultaneously displayed measurements
- Low concentration range reading stability
- Known addition and subtraction incremental methods
- 5 language choices: English, Spanish, French, German and Italian
- Meter prompts and shortcut keys
- Thermo Scientific Orion EZ Startup™ for quick and easy meter set-up
- Thermo Scientific Orion SMART STABILITY™ and SMART AVERAGING™ for accurate and fast results
- E_H ORP calibration capability
- 10 methods stored per channel – retains calibrations among multiple electrodes
- 1000 point datalogging with time and date stamping
- Calibration, high point and low point alarms
- Calibration graph with slope data for on-screen viewing
- Star stirrer probe controlled directly from the meter
- Autosampler compatibility
- 3 year meter replacement warranty

Product Specifications

		CE | TUV | EPA
pH	Range	-2.000 to 19.999
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	±0.002
	Calibration Points	1 to 6
	Auto-Buffer Recognition	USA/NIST and EURO/DIN
ISE	Range	0 to 19999
	Resolution	1,2 or 3 significant digits
	Relative Accuracy	±0.2 mV or 0.05 %, whichever is greater
	Units	ppm, ppb, M, % or unitless
	Technique Options	Single known addition and subtraction Double known addition and subtraction
	Calibration Points	2 to 6
	Calibration Options	Linear, point to point, non-linear selectable auto-bank
mV/ Rel mV/ ORP	Range	±1999.9
	Resolution	0.1
	Relative Accuracy	±0.2 or 0.05 %, whichever is greater
	E_H Calibration Capability	Yes
Temperature	Range	-5 to 105 °C
	Resolution	0.1
	Relative Accuracy	±0.1 °C

Features

Backlight	5 adjustable levels
Method Storage	20 (10 per channel with calibration data)
Password Protection	Yes
Datalog Points	1000 with time/date stamp
Data Transfer	RS232, USB
IP Rating	IP54
Power	Universal AC adapter (110V/220V/240V) included with meter
Warranty	36 months replacement

Meter Ordering Information

Cat. No.	Description
2115000	- Orion DUAL STAR pH/ISE meter - Stainless steel ATC probe (927007MD) - Swing arm electrode stand (090043) - RS232 cable (1010053) - Universal power adapter - User guide
2115101	- Orion DUAL STAR pH/ISE meter - 8102BNUWP ROSS Ultra® pH electrode - Stainless steel ATC probe (927007MD) - RS232 cable (1010053) - Swing arm electrode stand (090043) - Universal power adapter - User guide
2115102	- Orion DUAL STAR pH/ISE meter - 8157BNUMD ROSS Ultra pH/ATC Triode™ refillable electrode - RS232 cable (1010053) - Universal power adapter - User guide
2115001	- Orion DUAL STAR pH/ISE meter - 8102BNUWP ROSS Ultra pH electrode - Stainless steel ATC probe (927007MD) - RS232 cable (1010053) - Swing arm electrode stand (090043) - Pint of pH 4.01 buffer (910104) - Pint of pH 7.00 buffer (910107) - Pint of pH 10.01 buffer (910110) - Pint of ROSS® electrode storage solution (810001) - Universal power adapter - User guide

Accessories

Cat. No.	Description
096019	Thermo Scientific Orion stirrer probe with paddle
910104	pH 4.01 buffer, 475 mL
910107	pH 7.00 buffer, 475 mL
910110	pH 10.01 buffer, 475 mL





Thermo Scientific Orion Star A214

pH/ISE Benchtop Meter

The Thermo Scientific Orion Star A214 pH/ISE Benchtop Meter is the ideal choice for dedicated ISE analysis. Whether you use ISE infrequently or have multiple samples every day, get the information you need quickly and easily from the large, backlit graphic LCD display. Informative display shows pH/mV/RmV/ISE results and temperature along with electrode status, time, date, sample ID, user ID and calibration points. For advanced users, features such as stability and averaging choices provide additional options.

Features and Benefits

- Anyone can use this meter with its plain language screen prompts, soft keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen, ready indicator alerts when readings are stable and timed reading gathers data in specific time intervals
- Up to 5 point pH calibration with automatic recognition for USA/NIST and DIN buffers
- Up to 5 point ISE calibration with advanced features such as timed end point, linear point-to-point, non-linear selectable auto-blank and low-concentration range stability
- Fix errors without a complete recalibration with the calibration editing function
- Non-volatile memory holds up to 2000 data points with time and date stamp
- Stores up to 10 methods allow for customized procedures to differentiate between tests and/or users
- Easily transfer data and keep meter software up-to-date with the USB and RS232 ports and complimentary data analysis software
- Mix samples without a stir plate with direct control of the Orion Star stirrer probe (096019, sold separately)
- Included electrode arm and newly-designed probe holder make it easier to maintain and place probes into samples
- Works with almost every AC power source with the included universal power adapter, or use four AA batteries (sold separately) to run the meter on DC power
- IP54-rated housing handles splashes and is wall-mountable if table space is a problem
- 3 year meter replacement warranty

Keep turning the pages for more great finds.





Product Specifications

		CE | TUV | FCC
pH	Range	-2.000 to 20.000
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	±0.002
	Calibration Points	Up to 5
	Calibration Editing	Yes
mV/Rel mV/ ORP	Range	±2000.0 mV
	Resolution	0.1
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	E_H ORP Mode	Yes
ISE	Range	0 to 19999
	Resolution	Up to 3 significant digits
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	Units	ppm, M, mg/L, %, ppb, none
	Calibration Points	Up to 5
	Calibration Editing	Yes
	Calibration Features	Timed end point, linear point to point, non-linear selectable auto-blank, low concentration range stability
Temperature	Range	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Datalogging	Number of Datalogs	2000 with time and date stamp
	Log Function	Manual, ready (include AUTO-READ™), timed
Inputs	pH Electrode	BNC, reference pin
	ATC Probe	8-pin mini-DIN
Output		RS232, USB
Power	AC Adapter	Included – universal, 100-240 VAC
	Battery Power	Optional – 4 AAs
	Battery Life	800 hrs

Meter Ordering Information

Cat. No.	Description
STARA2140	**Orion Star A214 pH/ISE Benchtop Meter** - Electrode arm with redesigned holder - Universal power adapter
STARA2145	**Orion Star A214 pH/ISE Benchtop Meter Kit** - 8102BNUWP Orion ROSS Ultra pH electrode - 927007MD ATC probe, stainless steel - 096019 Orion Star stirrer probe - 810199 ROSS solution kit (475 mL each of pH 4, 7 and 10 buffers; storage solution; cleaning solution; and pH electrode storage bottle) - Electrode arm with redesigned holder - Universal power adapter
STARA2146	**Orion Star A214 pH/ISE Benchtop Meter Kit for Ammonia** - 8102BNUWP Orion ROSS Ultra pH electrode - 9512HPBNWP Orion high-performance Ammonia ISE - 927007MD ATC probe, stainless steel - 096019 Orion Star stirrer probe - 951007 Orion Ammonia 1000 ppm standard, 475 mL - 951210 Orion Low-level Ammonia ISA - 951213 Ammonia ISE storage solution - Electrode arm with redesigned holder - Universal power adapter
STARA2147	**Orion Star A214 pH/ISE Benchtop Meter Kit for Fluoride** - 8102BNUWP Orion ROSS Ultra pH electrode - 9609BNWP Orion fluoride ISE - 927007MD ATC probe, stainless steel - 096019 Orion Star stirrer probe - 040906 Orion fluoride standard, 1 ppm with TISABII, 475 mL - 040907 Orion fluoride standard, 2 ppm with TISABII, 475 mL - 040908 Orion fluoride standard, 10 ppm with TISAB II, 475 mL - 940909 Orion TISABII solution, 1 gallon - Electrode arm with redesigned holder - Universal power adapter
STARA2148	**Orion Star A214 pH/ISE Benchtop Meter Kit for Sodium** - 8102BNUWP Orion ROSS Ultra pH electrode - 8611BNWP Orion ROSS sodium ISE - 927007MD ATC probe, stainless steel - 096019 Orion Star stirrer probe - Electrode arm with redesigned holder - Universal power adapter

Accessories

Cat. No.	Description
810199	Orion ROSS All-in-One pH buffer kit
951007	Ammonia standard, 1000 ppm, 475 mL
951210	Low-level ammonia ISA
951211	Ammonia ISA, 475 mL
040906	Fluoride standard, 1 ppm with TISAB II, 475 mL
040907	Fluoride standard, 2 ppm with TISAB II, 475 mL
040908	Fluoride standard, 10 ppm with TISAB II, 475 mL
940909	TISAB II, 1 gallon



Thermo Scientific Orion VERSA STAR 50

pH/Conductivity Benchtop Meters

Ideal for checking solution conductivity and follow-up pH testing. The large color display is easy to read and easy on the eyes. Prompts make accuracy and repeatability easy for even the most complicated testing. If you need to add more channels for more or obtain more parameters from the same, simply remove the protective individual channel cover and add the new module.

Features and Benefits

- Versatility is the name of the game
  - Customize the display to show only the information you need
  - Change out modules to create the meter you need at any time
- Up to 6 point pH calibration with automatic recognition for USA/NIST and DIN buffers and electrode identification
- Fix errors without a complete recalibration with the calibration editing function
- Conductivity, TDS, salinity or resistivity capabilities
  - Selectable reading reference temperatures of 5, 10, 15, 20 or 25 °C
  - Linear, non-linear, nLFu or USP/EP curve options to get the most accurate conductivity result for your sample and temperature
  - Choice of practical salinity or natural sea water curves for salinity readings
  - Linear or ISO/EN 27888 curves for TDS
- Anyone can use this meter with its plain language screen prompts, function keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen, ready indicator alerts when readings are stable and timed reading gathers data in specific time intervals or just once with the single-shot mode
- Non-volatile memory holds up to 2000 data points with time and date stamp
- Stores up to 10 methods per channel allow for customized procedures to differentiate between tests and/or users
- Two USB and a RS232 port makes for easy data transfer and updating meter software
- Includes data analysis software for easy transferring of stored results or real-time viewing
- Control sample mixing directly from the meter without a separate stir plate when using with the Orion Star stirrer probe (cat. no. 096019, sold separately)
- Increase your productivity – with two stirrer probe ports, add stirrers and modules to analyze two separate samples at the same time
- Included electrode arm and newly-designed probe holder make it easier to maintain and place probes into samples
- Works with almost every AC power source through the included universal power adapter
- IP54-rated housing handles splashes and cleans up easily
- 3 year meter replacement warranty

Product Specifications – Orion VERSA STAR Meter

		CE | TUV | EPA
Maximum Number of Modules		4
Methods		Up to 10
Datalogging	**Number of Datalogs**	2000 with time and date stamp
	Log Function	Manual, AUTO-READ™, timed interval, single timed reading
Communication Ports		One RS232, two USB ports (one client, one host)
Orion Star Stirrer Probe Ports		2
Power		Universal, AC power adapter, 90-260 VAC, 50-60 Hz

Product Specifications – pH Module (VSTAR-PH)

		CE | TUV | EPA
pH	**Range**	-2.000 to 20.000
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	±0.002
	Calibration Points	Up to 6
	Calibration Editing	Yes
	Adjustable ISO Point	Yes
mV/Rel mV/ ORP	**Range**	±2000.0 mV
	Resolution	0.1
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	E_H ORP Mode	Yes
Temperature	**Range**	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Inputs	**pH/ISE**	BNC, reference pin
	ATC	8-pin mini-DIN

Product Specifications – Conductivity Module (VSTAR-CND)

		CE | TUV | EPA
Conductivity	Range	0.001 µS to 3000 mS
	Resolution	0.001 µS minimum; 4 significant figures minimum
	Relative Accuracy	0.5 % reading ±1 digit
	Reference Temperature	5, 10, 15, 20, 25 °C
	Temperature Compensation	Linear (0 to 10.0 %/°C), nLn, nLFu, USP/EP
	Compatible Cell Constants	0.001 to 199.9
	Calibration Points	Up to 6 points
	Calibration Editing	Yes
Resistivity	Range	2 ohm to 100 meg-ohm
	Resolution	2 ohms-cm
	Relative Accuracy	0.5 % reading ±1 digit
Salinity	Type	Practical salinity or natural sea water
	Range	0.01 to 80.0 ppt NaCl equivalent; 0.01 to 42 ppt sea water
	Resolution	0.01
	Relative Accuracy	±0.1
TDS	Range	0 to 200 ppt
	Resolution	4 significant digits
	Relative Accuracy	±0.5 % reading ±1 digit
	TDS Factor Range	Linear 0.01 to 10.00
Temperature	Range	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Inputs		8-pin mini-DIN



Meter Ordering Information

Cat. No.	Description
VSTAR50	**Orion VERSA STAR pH/Conductivity Benchtop Meter Set** - Orion VERSA STAR meter - Orion VERSA STAR pH/temperature module - Orion VERSA STAR conductivity/temperature module - Electrode arm with redesigned holder - Universal power adapter
VSTAR52	**Orion VERSA STAR pH/Conductivity Benchtop Meter Kit** - Orion VERSA STAR meter with pH/temperature module - Orion VERSA STAR conductivity/temperature module - 8157BNUMD Orion ROSS Ultra Triode pH/ATC probe - 013005MD Orion DuraProbe conductivity cell, K=0.475 - 810199 ROSS solution kit (475 mL each of pH 4, 7 and 10 buffers; storage solution; cleaning solution; and pH electrode storage bottle) - 011007 conductivity standard, 1413 µS, 5 x 60 mL - Electrode arm with redesigned holder - Universal power adapter

Accessories

Cat. No.	Description
VSTAR-PH	Orion VERSA STAR pH/temperature module
VSTAR-ISE	Orion VERSA STAR pH/ISE/temperature module
VSTAR-CND	Orion VERSA STAR conductivity/temperature module
VSTAR-RD	Orion VERSA STAR RDO/DO/temperature module
VSTAR-LR	Orion VERSA STAR pH/temperature with LogR technology module
STARA-BEA	Benchtop electrode arm for Orion Star A-series meters
STARA-HB	Freestanding base for use with Orion Star A-series benchtop electrode arm
STARA-PWR	Replacement universal power adapter for Orion VERSA STAR meters
096019	Orion Star stirrer probe
8102BNUWP	Orion ROSS Ultra pH electrode, refillable, glass body
8172BNWP	Orion ROSS Sure-Flow pH electrode, glass body
8156BNUWP	Orion ROSS Ultra refillable pH electrode, epoxy body
8157BNUMD	Orion ROSS Triode pH/ATC electrode, refillable, epoxy body
8302BNUMD	Orion ROSS Triode pH/ATC electrode, refillable, glass body
927007MD	Orion ATC probe, stainless steel body
927005MD	Orion ATC probe, epoxy body
013005MD	Orion DuraProbe conductivity cell, 4-cell, K=0.475
013016MD	Orion conductivity cell, flow through, K=0.1
810199	Orion ROSS all-in-one pH buffer kit
910104	Orion pH 4.01 buffer, 475 mL
910107	Orion pH 7.00 buffer, 475 mL
910110	Orion pH 4.01 buffer, 475 mL
011008	Orion conductivity standard, 100 µS/cm, 5 x 60 mL bottles
011007	Orion conductivity standard, 1413 µS/cm, 5 x 60 mL bottles
011006	Orion conductivity standard, 12.9 mS/cm, 5 x 60 mL bottles
1010001	Orion conductivity calibration resistor kit



Thermo Scientific Orion Star A215

pH/Conductivity Benchtop Meter

The Thermo Scientific Orion Star A215 pH/Conductivity Benchtop Meter is the ideal choice for any pharmacology lab. Get the information you need quickly and easily from the large, backlit graphic LCD display. Informative display shows individual pH/mV/RmV or conductivity/TDS/salinity/resistivity results with temperature, or all results at once. Additional helpful information includes electrode status, time, date, sample ID, user ID and calibration. For advanced users, features such as stability and averaging choices provide additional options.





Features and Benefits

- Anyone can use this meter with its plain language screen prompts, soft keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen, ready indicator alerts when readings are stable and timed reading gathers data in specific time intervals
- Up to 5 point pH calibration with automatic recognition for USA/NIST and DIN buffers and calibration editing to fix errors without a complete recalibration
- Selectable cell constant allows for use with 2- or 4-cell conductivity cells
- For accurate conductivity results, selectable reading reference temperatures of 5, 10, 15, 20 or 25 ºC with linear, non-linear, nLFu or USP/EP curve options
- Choice of practical salinity or natural sea water curves for salinity readings
- Linear or ISO/EN 27888 curves for TDS
- Non-volatile memory holds up to 2000 data points with time and date stamp
- Stores up to 10 methods allow for customized procedures to differentiate between tests and/or users
- Easily transfer data and keep meter software up-to-date with the USB and RS232 ports and complimentary data analysis software
- Mix samples without a stir plate with direct control of the Orion Star stirrer probe (096019, sold separately)
- Included electrode arm and newly-designed probe holder make it easier to maintain and place probes into samples
- Works with almost every AC power source with the included universal power adapter, or use four AA batteries (sold separately) to run the meter on DC power
- IP54-rated housing handles splashes and is wall-mountable if table space is a problem
- 3 year meter replacement warranty



Product Specifications

		CE | TUV | FCC
pH	Range	-2.000 to 20.000
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	±0.002
	Calibration Points	Up to 5
	Calibration Editing	Yes
mV/Rel mV/ ORP	Range	±2000.0 mV
	Resolution	0.1
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	E_H ORP Mode	Yes
Conductivity	Range	0.001 µS to 3000 mS
	Resolution	0.001 µS minimum; 4 significant figures minimum
	Relative Accuracy	0.5 % reading ±1 digit
	Reference Temperature	5, 10, 15, 20, 25 °C (default)
	Temperature Compensation	Linear (0 to 10.0 %/°C), nLn, nLFu, USP/EP
	Compatible Cell Constants	0.001 to 199.9
	Calibration Points	Up to 5 points
	Calibration Editing	Yes
Resistivity	Range	2 ohm to 100 meg-ohm
	Resolution	2 ohms-cm
	Relative Accuracy	0.5 % reading ±1 digit
Salinity	Type	Practical salinity or natural sea water
	Range	0.01 to 80.0 ppt NaCl equivalent; 0.01 to 42 ppt sea water
	Resolution	0.01
	Relative Accuracy	±0.1
TDS	Range	1 to 200 ppt
	Resolution	4 significant digits
	Relative Accuracy	0.5 % reading ±1 digit
	TDS Factor Range	Linear 0.01 to 10.00, default 0.49
Temperature	Range	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Datalogging	Number of Datalogs	2000 with time and date stamp
	Log Function	Manual, ready (include AUTO-READ™), timed
Inputs	pH Electrode	BNC, reference pin
	Conductivity with Temperature Probe or ATC Probe	8-pin mini-DIN
Output		RS232, USB
Power	AC Adapter	Included – universal, 100-240 VAC
	Battery Power	Optional – 4 AAs
	Battery Life	800 hrs

Meter Ordering Information

Cat. No.	Description
STARA2150	**Orion Star A215 pH/Conductivity Benchtop Multiparameter Meter** - Electrode arm with redesigned holder - Universal power adapter
STARA2155	**Orion Star A215 pH/Conductivity Benchtop Multiparameter Meter Kit** - 8157BNUMD Orion ROSS Ultra Triode pH/ATC electrode - 013005MD Orion DuraProbe conductivity cell - ROSS solution kit (475 mL each of pH 4, 7 and 10 buffers; storage solution; cleaning solution; and pH electrode storage bottle) - 011007 Orion 1413 µS conductivity standard, 5 x 60 mL - Electrode arm with redesigned holder - Universal power adapter

Accessories

Cat. No.	Description
096019	Orion Star stirrer probe
STARA-BEA	Benchtop electrode arm for Orion Star A-series meters
STARA-HB	Freestanding base for use with Orion Star A-series benchtop electrode arm
8302BNUMD	Orion ROSS Triode 3-in-1 pH/ATC probe, refillable, glass body
8102BNUWP	Orion ROSS Ultra refillable pH electrode, glass body
927007MD	Orion ATC probe, stainless steel
810199	Orion ROSS All-in-One pH buffer kit
910104	Orion pH 4.01 buffer, 475 mL
910107	Orion pH 7.00 buffer, 475 mL
910110	Orion pH 4.01 buffer, 475 mL
013005MD	Orion DuraProbe conductivity cell, 4-cell, K=0.475
013016MD	Orion 2-electrode conductivity cell with flow cell, K=0.1
011008	Orion conductivity standard, 100 µS/cm, 5 x 60 mL bottles
011007	Orion conductivity standard, 1413 µS/cm, 5 x 60 mL bottles
011006	Orion conductivity standard, 12.9 mS/cm, 5 x 60 mL bottles
1010001	Orion conductivity calibration resistor kit

We have more to excite you. Turn the page to find out!

pH
ISE
ORP
Cond
RDO
DO
Temp



Thermo Scientific Orion Star A216

pH/RDO/Dissolved Oxygen Benchtop Meter

The Thermo Scientific Orion Star A216 pH/RDO/Dissolved Oxygen Benchtop Meter is great for checking pH and dissolved oxygen levels at the same time from various wastewater samples. Get the information you need quickly and easily from the large, backlit graphic LCD display. Informative display shows individual pH/mV/RmV result, dissolved oxygen in percent saturation or concentration results with temperature, or all results at once. Additional helpful information includes electrode status, time, date, sample ID, user ID and calibration. For advanced users, features such as stability and averaging choices provide additional options.



Features and Benefits

- Anyone can use this meter with its plain language screen prompts, soft keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen, ready indicator alerts when readings are stable and timed reading gathers data in specific time intervals
- Up to 5 point pH calibration with automatic recognition for USA/NIST and DIN buffers and calibration editing to fix errors without a complete recalibration
- No need to worry about DO probe compatibility – the meter accepts and automatically recognizes Orion polarographic and RDO optical/luminescence-based probes
- Accurate DO results are easier with automatic temperature, manual salinity and automatic/manual barometric pressure compensation
- Calibrate DO by using water-saturated air, air-saturated water, a Winkler titration or zero point calibration
- Non-volatile memory holds up to 2000 data points with time and date stamp
- Stores up to 10 methods allow for customized procedures to differentiate between tests and/or users
- Easily transfer data and keep meter software up-to-date with the USB and RS232 ports and complimentary data analysis software
- To mix samples without a stir plate or for faster BOD readings, meter can directly control the 096019 Orion Star stirrer or 086030MD Orion AUTO-STIR™ DO probes (each sold separately)
- Included electrode arm and newly-designed probe holder make it easier to maintain and place probes into samples
- Works with almost every AC power source with the included universal power adapter, or use four AA batteries (sold separately) to run the meter on DC power
- IP54-rated housing handles splashes and is wall-mountable if table space is a problem
- 3 year meter replacement warranty



Product Specifications

		CE | TUV | FCC
pH	Range	-2.000 to 20.000
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	±0.002
	Calibration Points	Up to 5
	Calibration Editing	Yes
mV/Rel mV/ ORP	Range	±2000.0 mV
	Resolution	0.1
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	E_H ORP Mode	Yes
Dissolved Oxygen	**Concentration - Polarographic**	
	Range	0 to 90 mg/L
	Resolution	0.01, 0.1
	Relative Accuracy	±0.2
	% Saturation - Polarographic	
	Range	0 to 600
	Resolution	0.1, 1
	Relative Accuracy	±2 %
	Concentration - RDO	
	Range	0 to 50 mg/L
	Resolution	0.01, 0.1
	Relative Accuracy	±0.1 mg/L up to 8 mg/L; ±0.2 mg/L from 8 to 20 mg/L; 10 % of reading from 20 to 50 mg/L
	% Saturation - RDO	
	Range	0 to 500
	Resolution	0.1, 1
	Relative Accuracy	±2 %
	Manual Barometric Pressure Correction	450.0 to 850.0 mm Hg
	Manual Salinity Factor Correction	0 to 45 ppt
	Calibration Features	Water-saturated air, air saturated water, manual (Winkler) and zero point
	Probe Characteristics	Polarographic or RDO
Temperature	Range	0 to 50 °C, 32 to 122 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Datalogging	Number of Datalogs	2000 with time and date stamp
	Log Function	Manual, ready (includes AUTO-READ™), timed
Inputs	pH Electrode	BNC, reference pin
	DO with Temp. Probe	9-pin mini-DIN
Output		RS232, USB
Power	AC Adapter	Optional – universal, 100-240 VAC
	Battery Power	Optional – 4 AAs
	Battery Life	800 hrs

Meter Ordering Information

Cat. No.	Description
STARA2160	**Orion Star A216 pH/Dissolved Oxygen Benchtop Multiparameter Meter** - Electrode arm with redesigned holder - Universal power adapter
STARA2165	**Orion Star A216 pH/Dissolved Oxygen Benchtop Multiparameter Meter Kit** - 8157BNUMD Orion ROSS Ultra Triode pH/ATC electrode - 083005MD Orion polarographic DO probe with calibration sleeve - 080513 polarographic DO probe maintenance kit - 970802 BOD funnel/stirrer - 080360 BOD adapter - 810199 ROSS solution kit (475 mL each of pH 4, 7 and 10 buffers; storage solution; cleaning solution; and pH electrode storage bottle) - Electrode arm with redesigned holder - Universal power adapter

Accessories

Cat. No.	Description
096019	Orion Star stirrer probe
STARA-BEA	Benchtop electrode arm for Orion Star A-series meters
STARA-HB	Freestanding base for use with Orion Star A-series benchtop electrode arm
8302BNUMD	Orion ROSS Triode 3-in-1 pH/ATC probe, refillable, glass body
8102BNUWP	Orion ROSS Ultra refillable pH electrode, glass body
927007MD	Orion ATC probe, stainless steel
810199	Orion ROSS All-in-One pH buffer kit
910104	Orion pH 4.01 buffer, 475 mL
910107	Orion pH 7.00 buffer, 475 mL
910110	Orion pH 4.01 buffer, 475 mL
083005MD	Orion polarographic DO probe, 1.5m cable
086030MD	Orion polarographic AUTO-STIR DO/BOD probe, 1.5m cable
087010MD	Orion RDO optical DO probe, 3m cable with stainless steel guard and calibration sleeve
970802	Orion BOD funnel and stirrer for use with polarographic probes
080360	Orion BOD bottle adapter for use with polarographic probes

pH
ISE
ORP
Cond
RDO
DO
Temp



Thermo Scientific Orion VERSA STAR 10 & 80

pH and pH with LogR™ Technology Benchtop Meters

Routine pH measurements are quick and easy with the Orion VERSA STAR 10 and 80 pH benchtop meters. The large color display is easy on to read and easy on the eyes. Prompts make accuracy and repeatability easy for even the most complicated testing. If you need to add more channels for more or obtain more parameters from the same, simply remove the protective individual channel cover and add the new module.

The Orion VERSA STAR 10 pH benchtop meter comes complete with a single channel pH module, offering:

- Up to 6 point pH calibration with automatic recognition for USA/NIST and DIN buffers and electrode identification
- The time-saving option to fix errors without a complete recalibration with the calibration editing function

The Orion VERSA STAR 80 pH with LogR technology benchtop meter includes one LogR module, which fits easily into two channel slots. This technology allows for:

- Having all the features of the VERSA STAR 10 pH benchtop meter
- Preventing wasted efforts and time from bad electrodes by offering the most advanced electrode diagnostics
- Using even less of those expensive samples for testing and still getting accurate pH results since LogR technology allows for temperature-compensated pH readings without a temperature sensor

Features and Benefits

- Versatility is the name of the game
  - Customize the display to show only the information you need
  - Change out modules to create the meter you need at any time
- Anyone can use this meter with its plain language screen prompts, function keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen, ready indicator alerts when readings are stable and timed reading gathers data in specific time intervals or just once with single-shot mode
- Non-volatile memory holds up to 2000 data points with time and date stamp
- Stores up to 10 methods per channel allow for customized procedures to differentiate between tests and/or users
- Two USB and a RS232 port makes for easy data transfer and updating meter software
- Includes data analysis software for easy transferring of stored results or real-time viewing
- Control sample mixing directly from the meter without a separate stir plate when using with the Orion Star stirrer probe (cat. no. 096019, sold separately)
- Increase your productivity – with two Orion stirrer probe ports, add stirrers and modules to analyze two separate samples at the same time
- Included electrode arm and newly-designed probe holder make it easier to maintain and place probes into samples
- Works with almost every AC power source through the included universal power adapter
- IP54-rated housing handles splashes and cleans up easily
- 3 year meter replacement warranty

Product Specifications – Orion VERSA STAR Meter

		CE | TUV | EPA
Maximum Number of Modules		4
Methods		Up to 10
Datalogging	**Number of Datalogs**	2000 with time and date stamp
	Log Function	Manual, AUTO-READ™, timed interval, single timed reading
Communication Ports		One RS232, two USB ports (one client, one host)
Orion Star Stirrer Probe Ports		2
Power		Universal, AC power adapter, 90-260 VAC, 50-60 Hz





Product Specifications – pH Module (VSTAR-PH)

		CE | TUV | EPA
pH	Range	-2.000 to 20.000
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	±0.002
	Calibration Points	Up to 6
	Calibration Editing	Yes
	Adjustable ISO Point	Yes
mV/Rel mV/ ORP	Range	±2000.0 mV
	Resolution	0.1
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	E_H ORP Mode	Yes
Temperature	Range	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Inputs	pH/ISE	BNC, reference pin
	ATC	8-pin mini-DIN

Product Specifications – pH/LogR Module (VSTAR-LR)

		CE | TUV | EPA
pH	Range	-2.000 to 20.000
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	±0.002
	Calibration Points	Up to 6
	Calibration Editing	Yes
	Adjustable ISO Point	Yes
mV/Rel mV/ ORP	Range	±2000.0 mV
	Resolution	0.1
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	E_H ORP Mode	Yes
LogR Temperature	Range	0 to 100 °C, 32 to 212 °F
	Resolution	0.1
	Relative Accuracy	±0.5
	Resistance Range	0 to 6000 MΩ
	Resistance Resolution	0.1 MΩ up to 1999.9 MΩ, 1 MΩ above 1999.9 MΩ
	Offset Calibration	Up to 3 points
	Calibration Options	ATC probe, NIST reference
Temperature Measurement without LogR In-Use	Range	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Inputs	pH	BNC, reference pin
	ATC	8-pin mini-DIN

Meter Ordering Information

Cat. No.	Description
VSTAR10	**Orion VERSA STAR pH Benchtop Meter Set** - Orion VERSA STAR meter with pH/temperature module - Electrode arm with redesigned holder - Universal power adapter
VSTAR12	**Orion VERSA STAR pH Benchtop Meter Kit** - Orion VERSA STAR meter with pH/temperature module - 8302BNUMD Orion ROSS Triode pH/ATC probe - 096019 Orion Star stirrer probe - 810199 ROSS solution kit (475 mL each of pH 4, 7 and 10 buffers; storage solution; cleaning solution; and pH electrode storage bottle) - Electrode arm with redesigned holder - Universal power adapter
VSTAR80	**Orion VERSA STAR pH with LogR Benchtop Meter Set** - Orion VERSA STAR meter - Orion VERSA STAR pH/temperature with LogR technology module - 927007MD ATC probe, stainless steel - Electrode arm with redesigned holder - Universal power adapter
VSTAR82	**Orion VERSA STAR pH Benchtop Meter Kit** - Orion VERSA STAR meter - Orion VERSA STAR pH/temperature with LogR technology module - 8172BNWP Orion ROSS Sure-Flow pH electrode - 927007MD ATC probe, stainless steel - ROSS solution kit (475 mL each of pH 4, 7 and 10 buffers; storage solution; cleaning solution; and pH electrode storage bottle) - 810007 ROSS fill solution, 5 x 60 mL - Electrode arm with redesigned holder - Universal power adapter

Accessories

Cat. No.	Description
VSTAR-ISE	Orion VERSA STAR pH/ISE/temperature module
VSTAR-CND	Orion VERSA STAR conductivity/temperature module
VSTAR-RD	Orion VERSA STAR RDO/DO/temperature module
096019	Orion Star stirrer probe
8102BNUWP	Orion ROSS Ultra pH electrode, refillable, glass body
8172BNWP	Orion ROSS Sure-Flow pH electrode, glass body
8156BNUWP	Orion ROSS Ultra refillable pH electrode, epoxy body
8157BNUMD	Orion ROSS Triode pH/ATC electrode, refillable, epoxy body
8302BNUMD	Orion ROSS Triode pH/ATC electrode, refillable, glass body
927007MD	Orion ATC probe, stainless steel body
927005MD	Orion ATC probe, epoxy body
810199	Orion ROSS all-in-one pH buffer kit
910104	Orion pH 4.01 buffer, 475 mL
910107	Orion pH 7.00 buffer, 475 mL
910110	Orion pH 4.01 buffer, 475 mL

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pH
ISE
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Thermo Scientific Orion Star A211

pH Benchtop Meter

The Thermo Scientific Orion Star A211 pH Benchtop Meter is the ideal choice for dedicated pH testing in water, process, research and QA/QC samples. Get the information you need quickly and easily from the large, backlit graphic LCD display. Informative display shows pH/mV/RmV and temperature along with electrode status, time, date, sample ID, user ID and calibration points. For advanced users, features such as stability and averaging choices provide additional options.



Features and Benefits

- Anyone can use this meter with its plain language screen prompts, soft keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen, ready indicator alerts when readings are stable and timed reading gathers data in specific time intervals
- Up to 5 point pH calibration with automatic recognition for USA/NIST and DIN buffers
- Fix calibration errors without a complete recalibration with calibration editing
- Non-volatile memory holds up to 2000 data points with time and date stamp
- Stores up to 10 methods allow for customized procedures to differentiate between tests and/or users
- Easily transfer data and keep meter software up-to-date with the USB and RS232 ports and complimentary data analysis software
- Mix samples without a stir plate with direct control of the Orion Star stirrer probe (096019, sold separately)
- Included electrode arm and newly-designed probe holder make it easier to maintain and place probes into samples
- Works with almost every AC power source with the included universal power adapter, or use four AA batteries (sold separately) to run the meter on DC power
- IP54-rated housing handles splashes and is wall-mountable if table space is a problem
- 3 year meter replacement warranty





Product Specifications

		CE | TUV | FCC
pH	Range	-2.000 to 20.000
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	±0.002
	Calibration Points	Up to 5
	Calibration Editing	Yes
mV/Rel mV/ ORP	Range	±2000.0 mV
	Resolution	0.1
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	E_H ORP Mode	Yes
Temperature	Range	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Datalogging	Number of Datalogs	2000 with time and date stamp
	Log Function	Manual, ready (includes AUTO-READ™), timed
Inputs	pH Electrode	BNC, reference pin
	ATC Probe	8-pin mini-DIN
Output		RS232, USB
Power	AC Adapter	Included – universal, 100-240 VAC
	Battery Power	Optional – 4 AAs
	Battery Life	800 hrs

Meter Ordering Information

Cat. No.	Description
STARA2110	**Orion Star A211 pH Benchtop Meter** - Electrode arm with redesigned holder - Universal power adapter
STARA2115	**Orion Star A211 pH Benchtop Meter Kit** - 8302BNUMD Orion ROSS Triode 3-in-1 pH/ATC probe - 810199 ROSS solution kit (475 mL each of pH 4, 7 and 10 buffers; storage solution; cleaning solution; and pH electrode storage bottle) - Electrode arm with redesigned holder - Universal power adapter
STARA2116	**Orion Star A211 pH Benchtop Meter Kit with pH/ATC Triode Electrode** - 8157BNUMD Orion ROSS Ultra pH/ATC Triode electrode with epoxy body, refillable - 810199 All-in-One pH Buffer Kit (475 mL each of pH 4, 7 and 10 buffers; storage solution; and pH electrode storage bottle) - Electrode arm with redesigned holder - Universal power adapter

Accessories

Cat. No.	Description
096019	Orion Star stirrer probe
STARA-BEA	Benchtop electrode arm for Orion Star A-series meters
STARA-HB	Freestanding base for use with Orion Star A-series benchtop electrode arm
8302BNUMD	Orion ROSS Triode 3-in-1 pH/ATC probe, refillable, glass body
8102BNUWP	Orion ROSS Ultra refillable pH electrode, glass body
927007MD	Orion ATC probe, stainless steel
810199	Orion ROSS All-in-One pH buffer kit
910199	Orion Standard All-in-One pH buffer kit
910104	Orion pH 4.01 buffer, 475 mL
910107	Orion pH 7.00 buffer, 475 mL
910110	Orion pH 4.01 buffer, 475 mL



Thermo Scientific Orion Star A111

pH Benchtop Meter

Thermo Scientific Orion Star A111 pH Benchtop Meters combine simplicity with accuracy for dedicated pH applications. A large LCD displays pH or mV readings along with temperature. Icons provide quick updates on battery life, electrode status and calibration information. Simple button layout and onscreen messages help with calibration and setup menu choices.

Features and Benefits

- Large, informative screen clearly shows the main information, including pH or mV reading, temperature in ºC or ºF, meter mode, calibration information and power source
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen and ready indicator alerts when readings are stable
- Up to 3 point pH calibration
- Automatic recognition of USA/NIST and DIN buffers
- Easily recall calibration slope data for procedure checks
- Non-volatile memory holds up to 50 data points
- Included electrode arm and newly-designed probe holder make it easier to maintain and place probes into samples
- Plug the meter into almost any power outlet with the included universal power adapter, or use four AA batteries (sold separately) to run the meter on DC power
- The IP54-rated housing can handle splashes and can be wall-mounted if table space is a problem
- 3 year meter replacement warranty







Product Specifications

		CE | TUV | FCC
pH	Range	-2.00 to 16.00
	Resolution	0.1, 0.01
	Relative Accuracy	±0.01
	pH Calibration Points	Up to 3
mV/Rel mV/ ORP	Range - mV	±1600.0 mV
	Range - RmV	±1999.9 mV
	Resolution	0.1
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	E_H ORP Mode	No
Temperature	Range	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Temperature Compensation	Automatic or manual
	Temperature Offset Calibration	Yes
Datalogging	Number of Datalogs	50
	Log Function	Manual, Automatic with AUTO-READ™
Inputs	pH Electrode	BNC
	ATC Probe	8-pin mini-DIN
Power	AC Adapter	Included – universal, 100-240 VAC
	Battery Power	Optional – 4 AAs
	Battery Life	2000 hrs

Meter Ordering Information

Cat. No.	Description
STARA1110	**Orion Star A111 pH Benchtop Meter** - Electrode arm with redesigned holder - Universal power adapter
STARA1115	**Orion Star A111 pH Benchtop Meter Kit** - 9157BNMD Orion Triode 3-in-1 pH/ATC probe - Solution kit (60 mL each of pH 4, 7 and 10 buffers; storage solution and cleaning solution) - Electrode arm with redesigned holder - Universal power adapter
STARA1116	**Orion Star A111 pH Benchtop Meter Kit with TRIS-compatible Electrode** - GD9156BNWP Orion Green combination double-junction refillable pH electrode with epoxy body - 927007MD stainless steel ATC probe - Electrode arm with redesigned holder - Universal power adapter

Accessories

Cat. No.	Description
STARA-BEA	Benchtop electrode arm for Orion Star A-series meters
STARA-HB	Freestanding base for use with Orion Star A-series benchtop electrode arm
9157BNMD	Orion Triode 3-in-1 pH/ATC probe, refillable, epoxy body
9107BNMD	Orion Triode 3-in-1 pH/ATC probe, gel-filled, epoxy body
910199	Orion Standard All-in-One pH buffer kit - 475 mL each of 4.01, 7.00 and 10.01 buffers and pH electrode storage solution with pH electrode storage bottle
810199	Orion ROSS All-in-One pH buffer kit
910104	Orion pH 4.01 buffer, 475 mL
910107	Orion pH 7.00 buffer, 475 mL
910110	Orion pH 10.01 buffer, 475 mL
910001	Orion pH electrode storage solution, 475 mL
916099	Orion pH buffer assortment pack – 60 mL each of pH 4, 7 and 10 buffers; storage solution and cleaning solution D

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Thermo Scientific Orion VERSA STAR 20

Conductivity Benchtop Meters

Conductivity tests can be as clear as ultrapure water samples. The large color display is easy on to read and easy on the eyes. Prompts make accuracy and repeatability easy for even the most complicated testing. If you need to add more channels for more or obtain more parameters from the same, simply remove the protective individual channel cover and add the new module.



Features and Benefits

- Versatility is the name of the game
  - Customize the display to show only the information you need
  - Change modules to create the meter you need at any time
- Selectable reading reference temperatures of 5, 10, 15, 20 or 25 ºC
- Linear, non-linear, nLFu or USP/EP curve options to get the most accurate conductivity result for your sample and temperature
- Choice of practical salinity or natural sea water curves for salinity readings
- Linear or ISO/EN 27888 curves for TDS
- Anyone can use this meter with its plain language screen prompts, function keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen, ready indicator alerts when readings are stable and timed reading gathers data in specific time intervals or just once with single-shot mode
- Non-volatile memory holds up to 2000 data points with time and date stamp
- Stores up to 10 methods per channel allow for customized procedures to differentiate between tests and/or users
- Two USB and a RS232 port makes for easy data transfer and updating meter software
- Includes data analysis software for easy transferring of stored results or real-time viewing
- Control sample mixing directly from the meter without a separate stir plate when using with the Orion Star stirrer probe (cat. no. 096019, sold separately)
- Increase your productivity – with two Orion stirrer probe ports, add stirrers and modules to analyze two separate samples at the same time
- Included electrode arm and newly-designed probe holder make it easier to maintain and place probes into samples
- Works with almost every AC power source through the included universal power adapter
- IP54-rated housing handles splashes and cleans up easily
- 3 year meter replacement warranty



Product Specifications – Orion VERSA STAR Meter

		CE | TUV | EPA
Maximum Number of Modules		4
Methods		Up to 10
Datalogging	**Number of Datalogs**	2000 with time and date stamp
	Log Function	Manual, AUTO-READ™, timed interval, single timed reading
Communication Ports		One RS232, two USB ports (one client, one host)
Orion Star Stirrer Probe Ports		2
Power		Universal, AC power adapter, 90-260 VAC, 50-60 Hz

Product Specifications – Conductivity Module (VSTAR-CND)

		CE | TUV | EPA
Conductivity	**Range**	0.001 µS to 3000 mS
	Resolution	0.001 µS minimum; 4 significant figures minimum
	Relative Accuracy	0.5 % reading ±1 digit
	Reference Temperature	5, 10, 15, 20, 25 °C
	Temperature Compensation	Linear (0 to 10.0 %/°C), nLn, nLFu, USP/EP
	Compatible Cell Constants	0.001 to 199.9
	Calibration Points	Up to 6 points
	Calibration Editing	Yes
Resistivity	**Range**	2 ohm to 100 meg-ohm
	Resolution	2 ohms-cm
	Relative Accuracy	0.5 % reading ±1 digit
Salinity	**Type**	Practical salinity or natural sea water
	Range	0.01 to 80.0 ppt NaCl equivalent; 0.01 to 42 ppt sea water
	Resolution	0.01
	Relative Accuracy	±0.1
TDS	**Range**	0 to 200 ppt
	Resolution	4 significant digits
	Relative Accuracy	±0.5 % reading ±1 digit
	TDS Factor Range	Linear 0.01 to 10.00
Temperature	**Range**	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Input		8-pin mini-DIN

Meter Ordering Information

Cat. No.	Description
VSTAR20	**Orion VERSA STAR Conductivity Benchtop Meter Set** - Orion VERSA STAR meter - Orion VERSA STAR conductivity/temperature module - Electrode arm with redesigned holder - Universal power adapter
VSTAR22	**Orion VERSA STAR Conductivity Benchtop Meter Kit** - Orion VERSA STAR meter - Orion VERSA STAR conductivity/temperature module - 013005MD Orion DuraProbe conductivity cell, K=0.475 - 011007 conductivity standard, 1413 µS, 5 x 60 mL - Electrode arm with redesigned holder - Universal power adapter

Accessories

Cat. No.	Description
VSTAR-PH	Orion VERSA STAR pH/temperature module
VSTAR-ISE	Orion VERSA STAR pH/ISE/temperature module
VSTAR-CND	Orion VERSA STAR conductivity/temperature module
VSTAR-RD	Orion VERSA STAR RDO/DO/temperature module
VSTAR-LR	Orion VERSA STAR pH/temperature with LogR technology module
STARA-BEA	Benchtop electrode arm for Orion Star A-series meters
STARA-HB	Freestanding base for use with Orion Star A-series benchtop electrode arm
STARA-PWR	Replacement universal power adapter for Orion VERSA STAR meters
096019	Orion Star stirrer probe
013005MD	Orion DuraProbe conductivity cell, 4-cell, K=0.475
013016MD	Orion conductivity cell, flow through, K=0.1
011008	Orion conductivity standard, 100 µS/cm, 5 x 60 mL bottles
011007	Orion conductivity standard, 1413 µS/cm, 5 x 60 mL bottles
011006	Orion conductivity standard, 12.9 mS/cm, 5 x 60 mL bottles
1010001	Orion conductivity calibration resistor kit



Thermo Scientific Orion Star A212

Conductivity Benchtop Meter

The Thermo Scientific Orion Star A212 Conductivity Benchtop Meter is the ideal choice to help meet USP requirements. Get the information you need quickly and easily from the large, backlit graphic LCD display. Informative display shows conductivity/TDS/salinity/resistivity and temperature along with time, date, sample ID, user ID and calibration information. For advanced users, features such as stability and averaging choices provide additional options.



Features and Benefits

- Anyone can use this meter with its plain language screen prompts, soft keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen, ready indicator alerts when readings are stable and timed reading gathers data in specific time intervals
- Selectable cell constant allows for use with 2- or 4-cell conductivity cells
- For accurate results, selectable reading reference temperatures of 5, 10, 15, 20 or 25 ºC with linear, non-linear, nLFu or USP/EP curve options
- Choice of practical salinity or natural sea water curves for salinity readings
- Linear or ISO/EN 27888 curves for TDS
- Non-volatile memory holds up to 2000 data points with time and date stamp
- Stores up to 10 methods allow for customized procedures to differentiate between tests and/or users
- Easily transfer data and keep meter software up-to-date with the USB and RS232 ports and complimentary data analysis software
- Mix samples without a stir plate with direct control of the Orion Star stirrer probe (096019, sold separately)
- Included electrode arm and newly-designed probe holder make it easier to maintain and place probes into samples
- Works with almost every AC power source with the included universal power adapter, or use four AA batteries (sold separately) to run the meter on DC power
- IP54-rated housing handles splashes and is wall-mountable if table space is a problem
- 3 year meter replacement warranty



Product Specifications

		CE | TUV | FCC
Conductivity	Range	0.001 µS to 3000 mS
	Resolution	0.001 µS minimum; 4 significant figures minimum
	Relative Accuracy	0.5 % reading ±1 digit
	Reference Temperature	5, 10, 15, 20, 25 °C
	Temperature Compensation	Linear (0 to 10.0 %/°C), nLn, nLFu, USP/EP
	Compatible Cell Constants	0.001 to 199.9
	Calibration Points	Up to 5 points
	Calibration Editing	Yes
Resistivity	Range	2 ohm to 100 meg-ohm
	Resolution	2 ohms-cm
	Relative Accuracy	0.5 % reading ±1 digit
Salinity	Type	Practical salinity or natural sea water
	Range	0.01 to 80.0 ppt NaCl equivalent; 0.01 to 42 ppt sea water
	Resolution	0.01
	Relative Accuracy	±0.1
TDS	Range	1 to 200 ppt
	Resolution	4 significant digits
	Relative Accuracy	±0.5 % reading ±1 digit
	TDS Factor Range	Linear, 0.01 to 10.00
Temperature	Range	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Datalogging	Number of Datalogs	2000 with time and date stamp
	Log Function	Manual, ready (includes AUTO-READ™), timed
Inputs	Conductivity with Temperature Probe	8-pin mini-DIN
Output		RS232, USB
Power	AC Adapter	Included – universal, 100-240 VAC
	Battery Power	Optional – 4 AAs
	Battery Life	800 hrs

Meter Ordering Information

Cat. No.	Description
STARA2120	**Orion Star A212 Conductivity Benchtop Meter** - Electrode arm with redesigned holder - Universal power adapter
STARA2125	**Orion Star A212 Conductivity Benchtop Meter Kit** - 013005MD Orion DuraProbe conductivity probe, K=0.475 - 011007 conductivity standard, 1413 µS, 5 x 60 mL - Electrode arm with redesigned holder - Universal power adapter
STARA2126	**Orion Star A212 Conductivity Benchtop Meter Kit for Ultrapure Water** - 013016MD Orion conductivity probe with flow-through cell, K=0.1 - 011008 conductivity standard, 100 µS, 5 x 60 mL - Electrode arm with redesigned holder - Universal power adapter

Accessories

Cat. No.	Description
STARA-BEA	Benchtop electrode arm for Orion Star A-series meters
STARA-HB	Freestanding base for use with Orion Star A-series benchtop electrode arm
013005MD	Orion DuraProbe conductivity probe, 4-cell, K=0.475
013016MD	Orion 2-electrode conductivity probe with flow cell, K=0.1
011008	Orion conductivity standard, 100 µS/cm, 5 x 60 mL bottles
011007	Orion conductivity standard, 1413 µS/cm, 5 x 60 mL bottles
011006	Orion conductivity standard, 12.9 mS/cm, 5 x 60 mL bottles
1010001	Orion conductivity calibration resistor kit

Keep going to learn more about our newest meters.



Thermo Scientific Orion Star A112

Conductivity Benchtop Meter

Thermo Scientific Orion Star A112 Conductivity Benchtop Meters combine simplicity with accuracy for dedicated conductivity measurements. A large LCD displays conductivity or TDS readings along with temperature. Icons provide quick updates on battery life and completed calibration status. Simple button layout and onscreen messages help with calibration and setup menu choices.

Features and Benefits

- Large, informative screen clearly shows the main information, including conductivity or TDS reading, temperature in ºC or ºF, meter mode and power source
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen and ready indicator alerts when readings are stable
- Selectable cell constant
- Selectable reading reference temperatures of 20 ºC or 25 ºC for an accurate result
- Included electrode arm and newly-designed holder make it easier to maintain and place probes into samples
- Plug the meter into almost any power outlet with the included universal power adapter, or use four AA batteries (sold separately) to run the meter on DC power
- Non-volatile memory holds up to 50 data points
- The IP54-rated housing can handle splashes and can be wall-mounted if table space is a problem
- 3 year meter replacement warranty





Product Specifications

		CE | TUV | FCC
Conductivity	Range	0.1 µS/cm to 200 mS/cm
	Resolution	0.01 µS minimum; 3 significant figures minimum
	Relative Accuracy	0.5 % reading ±1 digit
	Reference Temperature	20, 25 °C (default)
	Temperature Compensation	Linear (0.0 to 10.0 %/°C)
	Compatible Cell Constants	0.001 to 10
	Calibration Points	1
TDS	Range	1 to 19,999 mg/L
	Resolution	4 significant digits
	Relative Accuracy	0.5 % reading ±1 digit
	TDS Factor Range	Linear, 0.01 to 10.00, default 0.49
Temperature	Range	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	Yes
Datalogging	Number of Datalogs	50
	Log Function	Manual, Automatic with AUTO-READ™
Inputs	Conductivity with Temperature Probe	8-pin mini-DIN
Power	AC Adapter	Included – universal, 100-240 VAC
	Battery Power	Optional – 4 AAs
	Battery Life	2000 hrs

Meter Ordering Information

Cat. No.	Description
STARA1120	**Orion Star A112 Conductivity Benchtop Meter** - Electrode arm with redesigned holder - Universal power adapter
STARA1125	**Orion Star A112 Conductivity Benchtop Meter Kit** - 011050MD orion conductivity cell, K=1.0 - 011007 conductivity standard, 1413 µS, 5 x 60 mL - Electrode arm with redesigned holder - Universal power adapter

Accessories

Cat. No.	Description
STARA-BEA	Benchtop electrode arm for Orion Star A-series meters
STARA-HB	Freestanding base for use with Orion Star A-series benchtop electrode arm
011050MD	Orion 2-electrode conductivity cell, K=1.0
013016MD	Orion 2-electrode conductivity cell with flow cell, K=0.1
011008	Orion conductivity standard, 100 µS/cm, 5 x 60 mL bottles
011007	Orion conductivity standard, 1413 µS/cm, 5 x 60 mL bottles
011006	Orion conductivity standard, 12.9 mS/cm, 5 x 60 mL bottles
1010001	Orion conductivity calibration resistor kit





Thermo Scientific Orion VERSA STAR 30

RDO/Dissolved Oxygen Benchtop Meters

BOD testing is complicated enough – no need for the meter to add to the confusion. The large color display is easy on to read and easy on the eyes. Prompts make accuracy and repeatability easy for even the most complicated testing. If you need to add more channels for more or obtain more parameters from the same, simply remove the protective individual channel cover and add the new module.

Discover the most advanced features in our new Orion VERSA STAR meters.



Features and Benefits

- Versatility is the name of the game
  - Customize the display to show only the information you need
  - Change modules to create the meter you need at any time
- Takes the worry out of DO probe compatibility – the meter accepts and automatically recognizes Orion polarographic and RDO optical/luminescence-based probes
- Compensates automatically for temperature, salinity with manual input and barometric pressure (automatic or manual)
- Allows for calibration using water-saturated air, air-saturated water, a Winkler titration or zero point
- Anyone can use this meter with its plain language screen prompts, function keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen, ready indicator alerts when readings are stable and timed reading gathers data in specific time intervals or just once with single-shot mode
- Non-volatile memory holds up to 2000 data points with time and date stamp
- Stores up to 10 methods per channel allow for customized procedures to differentiate between tests and/or users
- Two USB and a RS232 port makes for easy data transfer and updating meter software
- Complimentary data analysis software for easy transferring of stored results, real-time viewing and calculation of BOD, DOUR and SOUR results
- Control sample mixing directly from the meter without a separate stir plate when using with the Orion Star stirrer probe (cat. no. 096019, sold separately)
- Increase your productivity – with two Orion Star stirrer probe ports, add stirrers and modules to analyze two separate samples at the same time
- Included electrode arm and newly-designed probe holder make it easier to maintain and place probes into samples
- Works with almost every AC power source through the included universal power adapter
- IP54-rated housing handles splashes and cleans up easily
- 3 year meter replacement warranty



Product Specifications – Orion VERSA STAR Meter

		CE | TUV | EPA
Maximum Number of Modules		4
Methods		Up to 10
Datalogging	**Number of Datalogs**	2000 with time and date stamp
	Log Function	Manual, AUTO-READ™, timed interval, single timed reading
Communication Ports		One RS232, two USB ports (one client, one host)
Orion Star Stirrer Probe Ports		2
Power		Universal, AC power adapter, 90-260 VAC, 50-60 Hz

Product Specifications – RDO/DO Module (VSTAR-RD)

		CE | TUV | EPA
Dissolved Oxygen	**Concentration - Polarographic**	
	Range	0 to 90 mg/L
	Resolution	0.01, 0.1
	Relative Accuracy	±0.2
	% Saturation - Polarographic	
	Range	0 to 600
	Resolution	0.1, 1
	Relative Accuracy	±2 %
	Concentration - RDO	
	Range	0 to 50 mg/L
	Resolution	0.01, 0.1
	Relative Accuracy	±0.1 mg/L up to 8 mg/L; ±0.2 mg/L from 8 to 20 mg/L; 10 % of reading, 20 to 50 mg/L
	% Saturation - RDO	
	Range	0 to 500
	Resolution	0.1, 1
	Relative Accuracy	±2 %
	Automatic Barometric Pressure Correction	450.0 to 850.0 mm Hg
	Salinity Factor Correction	Automatic when used with conductivity module and probe or manual; 0 to 45 ppt
	Calibration Features	Water saturated air, air saturated water, manual (Winkler) and zero point
	Probe Type	Polarographic or RDO
Temperature	**Range**	0 to 50 °C, 32 to 122 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Input		9-pin mini-DIN

Meter Ordering Information

Cat. No.	Description
VSTAR30	**Orion VERSA STAR RDO/Dissolved Oxygen Benchtop Meter Set** - Orion VERSA STAR meter - Orion VERSA STAR dissolved oxygen/ temperature module - Electrode arm with redesigned holder - Universal power adapter
VSTAR32	**Orion VERSA STAR RDO/Dissolved Oxygen Benchtop Meter Kit** - Orion VERSA STAR meter - Orion VERSA STAR dissolved oxygen/ temperature module - 083005MD Orion polarographic DO probe - 080017 calibration sleeve for DO probe - 080513 DO probe maintenance kit - 970802 BOD funnel/stirrer - 080360 BOD adapter - Electrode arm with redesigned holder - Universal power adapter

Accessories

Cat. No.	Description
VSTAR-PH	Orion VERSA STAR pH/temperature module
VSTAR-ISE	Orion VERSA STAR pH/ISE/temperature module
VSTAR-CND	Orion VERSA STAR conductivity/temperature module
VSTAR-RD	Orion VERSA STAR RDO/DO/temperature module
VSTAR-LR	Orion VERSA STAR pH/temperature with LogR technology module
STARA-BEA	Benchtop electrode arm for Orion Star A-series meters
STARA-HB	Freestanding base for use with Orion Star A-series benchtop electrode arm
STARA-PWR	Replacement universal power adapter for Orion VERSA STAR meters
096019	Orion Star stirrer probe
083005MD	Orion dissolved oxygen probe, polarographic
086030MD	Orion auto-stir DO/BOD probe, polarographic
087010MD	Orion RDO optical DO probe, 3 m cable
080513	Maintenance kit, includes electrolyte solution, polishing disk, and two membrane caps for 083005MD and 086030MD
080514	Polarographic electrolyte solution for 083005MD and 086030MD
086021A	Replacement calibration chamber/stand for 086030MD
087001	Replacement optical/luminescence-based cap



Thermo Scientific Orion Star A213

RDO/Dissolved Oxygen Benchtop Meter

The Thermo Scientific Orion Star A213 RDO/Dissolved Oxygen (DO) Benchtop Meter is the ideal choice to ensure proper oxygen levels. Get the information you need quickly and easily from the large, backlit graphic LCD display. Informative display shows dissolved oxygen in percent saturation or concentration and temperature along with time, date, sample ID, user ID and calibration information. For advanced users, features such as stability and averaging choices provide additional options.



Features and Benefits

- Anyone can use this meter with its plain language screen prompts, soft keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- No need to worry about DO probe compatibility – the meter accepts and automatically recognizes Orion polarographic and RDO optical/luminescence-based probes
- Accurate results are easy with automatic temperature, manual salinity and your choice of automatic or manual barometric pressure compensation
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen, ready indicator alerts when readings are stable and timed reading gathers data in specific time intervals
- Calibrate using water-saturated air, air-saturated water, a Winkler titration or zero point calibration
- Non-volatile memory holds up to 2000 data points with time and date stamp
- Stores up to 10 methods allow for customized procedures to differentiate between tests and/or users
- Easily transfer data and keep meter software up-to-date with the USB and RS232 ports and complimentary data analysis software
- For faster BOD readings, control the Orion AUTO-STIR™ polarographic DO probe (086030MD, sold separately) directly from the meter
- Included electrode arm and newly-designed probe holder make it easier to maintain and place probes into samples
- Works with almost every AC power source with the included universal power adapter, or use four AA batteries (sold separately) to run the meter on DC power
- IP54-rated housing handles splashes and is wall-mountable if table space is a problem
- 3 year meter replacement warranty



Product Specifications

		CE | TUV | FCC
Dissolved Oxygen	**Concentration - Polarographic**	
	Range	0 to 90 mg/L
	Resolution	0.01, 0.1
	Relative Accuracy	±0.2
	% Saturation - Polarographic	
	Range	0 to 600
	Resolution	0.1, 1
	Relative Accuracy	±2 %
	Concentration - RDO	
	Range	0 to 50 mg/L
	Resolution	0.01, 0.1
	Relative Accuracy	±0.1 mg/L up to 8 mg/L; ±0.2 mg/L from 8 to 20 mg/L; 10 % of reading from 20 to 50 mg/L
	% Saturation - RDO	
	Range	0 to 500
	Resolution	0.1, 1
	Relative Accuracy	±2 %
	Automatic Barometric Pressure Correction	450.0 to 850.0 mm Hg
	Manual Salinity Factor Correction	0 to 45 ppt
	Calibration Features	Water-saturated air, air saturated water, manual (Winkler) and zero point
	Probe Characteristics	Polarographic or RDO
Temperature	Range	0 to 50 °C, 32 to 122 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Datalogging	Number of Datalogs	2000 with time and date stamp
	Log Function	Manual, ready (includes AUTO-READ™), timed
Inputs	DO with Temperature Probe	9-pin mini-DIN
Output		RS232, USB
Power	AC Adapter	Included – universal, 100-240 VAC
	Battery Power	Optional – 4 AAs
	Battery Life	800 hrs

Meter Ordering Information

Cat. No.	Description
STARA2130	**Orion Star A213 Dissolved Oxygen Benchtop Meter** - Electrode arm with redesigned holder - Universal power adapter
STARA2135	**Orion Star A213 Dissolved Oxygen Benchtop Meter Kit** - 083005MD Orion polarographic DO probe with calibration sleeve - 080513 polarographic DO probe maintenance kit - 970802 BOD funnel/stirrer - 080360 BOD adapter - Electrode arm with redesigned holder - Universal power adapter
STARA2136	**Orion Star A213 Dissolved Oxygen Benchtop Meter Kit with Self-Stirring Probe** - 086030MD Orion polarographic AUTO-STIR DO/BOD probe - 080513 DO probe maintenance kit - 080514 polarographic DO probe electrolyte solution - Electrode arm with redesigned holder - Universal power adapter

Accessories

Cat. No.	Description
STARA-BEA	Benchtop electrode arm for Orion Star A-series meters
STARA-HB	Freestanding base for use with Orion Star A-series benchtop electrode arm
083005MD	Orion polarographic DO probe, 1.5m cable
086030MD	Orion polarographic AUTO-STIR DO/BOD probe, 1.5m cable
087010MD	Orion RDO optical DO probe, 3m cable with stainless steel guard and calibration sleeve
080513	Orion polarographic DO probe maintenance kit
080514	Orion polarographic DO probe electrolyte solution, 60 mL
080017	Calibration sleeve for Orion polarographic DO probes
087003	Replacement calibration sleeve for Orion RDO optical probes
087001	Replacement optical cap for Orion RDO probes
970802	Orion BOD funnel and stirrer for use with polarographic probes
080360	Orion BOD bottle adapter for use with polarographic probes



Thermo Scientific Orion Star A113

Dissolved Oxygen Benchtop Meter

Thermo Scientific Orion Star A113 Dissolved Oxygen Benchtop Meters combine simplicity with accuracy for dedicated DO testing. Icons provide quick updates on battery life and completed calibration status. Simple button layout and onscreen messages help with calibration and setup menu choices.

Features and Benefits

- Large, informative screen clearly shows the main information, including DO reading in mg/L or % saturation, temperature in ºC or ºF, meter mode and power source
- Automatic temperature, manual salinity input and manual barometric pressure compensation for an accurate result
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen and ready indicator alerts when readings are stable
- Two calibration options to meet your requirements: water-saturated air method or a Winkler titration
- Accepts Thermo Scientific Orion polarographic dissolved oxygen probes
- Non-volatile memory holds up to 50 data points
- Included electrode arm and newly-designed holder make it easier to maintain and place probes into samples
- Plug the meter into almost any power outlet with the included universal power adapter, or use four AA batteries (sold separately)
- The IP54-rated housing can handle splashes and can be wall-mounted if table space is a problem
- 3 year meter replacement warranty







Product Specifications

		CE | TUV | FCC
Dissolved Oxygen	Concentration	
	Range	0 to 20 mg/L
	Resolution	0.01, 0.1
	Relative Accuracy	±0.2
	% Saturation	
	Range	0 to 200
	Resolution	0.1, 1
	Relative Accuracy	±2 %
	Manual Barometric Pressure Correction	450.0 to 850.0 mm Hg
	Manual Salinity Factor Correction	0 to 45 ppt
	Calibration Features	Water-saturated air, manual (Winkler)
	Sensor Type	Polarographic
Temperature	Range	0 to 50 °C, 32 to 122 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	Yes
Datalogging	Number of Datalogs	50
	Log Function	Manual, Automatic with AUTO-READ™
Inputs	DO with Temperature Probe	9-pin mini-DIN
Power	Power Cord	Included – universal, 100-240 VAC
	Battery Power	Optional – 4 AAs
	Battery Life	2000 hrs

Meter Ordering Information

Cat. No.	Description
STARA1130	**Orion Star A113 Dissolved Oxygen Benchtop Meter** - Electrode arm with redesigned holder - Universal power adapter
STARA1135	**Orion Star A113 Dissolved Oxygen Benchtop Meter Kit** - 083005MD Orion polarographic DO probe - 080017 calibration sleeve for DO probe - 080513 DO probe maintenance kit - Electrode arm with redesigned holder - Universal power adapter

Accessories

Cat. No.	Description
STARA-BEA	Benchtop electrode arm for Orion Star A-series meters
STARA-HB	Freestanding base for use with Orion Star A-series benchtop electrode arm
083005MD	Orion polarographic DO probe, 1.5m cable
080513	Orion polarographic DO probe maintenance kit
080017	Calibration sleeve for Orion polarographic DO probes
970802	Orion BOD funnel and stirrer for use with polarographic probes
080360	Orion BOD bottle adapter for use with polarographic probes

For accurate testing outside the lab, check out the Orion Star A portable meters on the following pages.



Thermo Scientific Orion VERSA STAR Advanced Electrochemistry Benchtop Meter & Modules

Don't see the benchtop meter parameter combination you need for your application? No problem – simply order the Orion VERSA STAR meter and choose the modules you need.

With versatility being the name of the game, you can also choose modules to add or change your existing Orion VERSA STAR meter to meet your latest testing needs. Simply swap out the modules when you need to and no need to wait to power down. The meter automatically recognizes the changes and datalogs remain unchanged and stored in the meter.

Each module includes the necessary probe connections for the measurement parameter. The meter includes two Orion Star stirrer probe ports, one RS232 port, two USB ports, power port and grounding port. Included with the meter are the benchtop electrode arm and individual channel covers to protect the channels not in use.

Meter and Module Ordering Information

Cat. No.	Description
VSTAR00	**Orion VERSA STAR Benchtop Meter** - Electrode arm with redesigned holder - Universal power adapter
VSTAR-PH	Orion VERSA STAR pH/temperature module
VSTAR-ISE	Orion VERSA STAR pH/ISE/temperature module
VSTAR-CND	Orion VERSA STAR conductivity/temperature module
VSTAR-RD	Orion VERSA STAR RDO/DO/temperature module
VSTAR-LR	Orion VERSA STAR pH/temperature with LogR technology module
STARA-BEA	Benchtop electrode arm
STARA-HB	Free-standing, weighted base for use with benchtop electrode arm (sold separately)





No need to turn off your meter to switch modules – meter automatically recognizes module changes.

- pH
- ISE
- ORP
- Cond
- RDO
- DO
- Temp

Thermo Scientific Orion Star A320, A220 and A120-Series Portable Meters

Outside the laboratory, testing brings enough of its own challenges from getting the sample to taking the reading. Just because you test outside the laboratory doesn't mean your testing accuracy or quality needs to suffer. The new Orion Star A series of portable meters features a variety of advantages to handle testing in difficult environments.



Protective plugs cover RS232 and USB ports to prevent corrosion

Bright, backlit LCD display clearly shows results on those bright, sunny days as well as the dark, rainy ones and in dark areas of the plant

IP-67 waterproof housing

Ergonomic design allows for one-handed operation and features a recessed groove in the back of the meter to fit fingers easily wrapping around the meter

Keypad texture works well with gloved and wet hands

Advanced meter design prevents water ingress through all connector ports.



Do you have access to an AC power source while testing?
Save battery life by running the meter off AC power with the optional adapter



Thermo Scientific Orion Star A329

pH/ISE/Conductivity/RDO/Dissolved Oxygen Portable Meter

The Thermo Scientific Orion Star A329 pH/ISE/Conductivity/RDO/Dissolved Oxygen Portable Meter is the top choice for advanced multiparameter measurements on location. Get the information you need quickly and easily from the large, backlit graphic LCD display. Informative display can show each parameter with temperature individually or all three with temperature on one screen. Additional helpful icons include electrode status, time, date, sample ID, user ID and calibration points. Advanced features such as stability and averaging options provide additional options allowing for laboratory accuracy everywhere you need it.



Features and Benefits

- Anyone can use this meter with its plain language screen prompts, soft keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen, ready indicator alerts when readings are stable and timed reading gathers data in specific time intervals
- Up to 5 point pH calibration with automatic recognition for USA/NIST and DIN buffers
- Fix pH and ISE calibration errors without a complete recalibration with calibration editing
- No need to worry about DO probe compatibility – the meter accepts and automatically recognizes Orion polarographic and RDO optical/luminescence-based probes
- It's easy to get accurate DO results with automatic temperature, automatic/manual barometric pressure and automatic salinity compensation when used with simultaneously with conductivity
- Calibrate for DO using water-saturated air, air-saturated water, a Winkler titration or zero point calibration
- Selectable cell constant allows for use with 2- or 4-cell conductivity cells
- For advanced accuracy in conductivity readings, selectable reading reference temperatures of 5, 10, 15, 20 or 25 ºC with linear, non-linear, nLFu or USP/EP curve options
- Choice of practical salinity or natural sea water curves for salinity readings
- Linear or ISO/EN 27888 curves for TDS
- Whether you use ISE infrequently or have multiple samples every day – up to 5 point ISE calibration with advanced features such as timed end point, linear point-to-point, non-linear selectable auto-blank and low-concentration range stability
- Non-volatile memory holds up to 5000 data points with time and date stamp
- Easily transfer data and keep meter software up-to-date with the USB and RS232 ports and complimentary data analysis software
- User and sample ID fields for additional data accuracy
- Stores up to 10 methods allow for customized procedures to differentiate between tests and/or users
- Four AA batteries (included) provide over 800 hours of operation or purchase the universal power adapter (sold separately) to use AC power
- Perfectly portable, waterproof and protected to take anywhere with a IP67-rated housing
- 3 year meter replacement warranty

Product Specifications

		CE | TUV | FCC
pH	Range	-2.000 to 20.000
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	±0.002
	Calibration Points	Up to 5
	Calibration Editing	Yes
mV/Rel mV/ ORP	Range	±2000.0 mV
	Resolution	0.1
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	E_H ORP Mode	Yes
ISE	Range	0 to 19999
	Resolution	Up to 3 significant digits
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	Units	ppm, M, mg/L, %, ppb, none
	Calibration Points	Up to 5
	Calibration Editing	Yes
	Calibration Features	Timed end point, linear point to point, non-linear selectable auto-blank, low concentration range stability
Conductivity	Range	0.001 µS to 3000 mS
	Resolution	0.001 µS minimum; 4 significant figures minimum
	Relative Accuracy	0.5 % reading ±1 digit
	Reference Temperature	5, 10, 15, 20, 25 °C (default)
	Temperature Compensation	Linear (0 to 10.0 %/°C), nLn, nLFu, USP/EP
	Compatible Cell Constants	0.001 to 199.9
	Calibration Points	Up to 5 points
	Calibration Editing	Yes
Resistivity	Range	2 ohm to 100 meg-ohm
	Resolution	2 ohms-cm
	Relative Accuracy	0.5 % reading ±1 digit



Please turn the page... this is just the beginning of the portable meters.

Product Specifications (Continued)

CE | TUV | FCC

Salinity	**Type**	Practical salinity or natural sea water
	Range	0.01 to 80.0 ppt NaCl equivalent; 0.01 to 42 ppu sea water
	Resolution	0.01
	Relative Accuracy	±0.1
TDS	**Range**	1 to 200 ppt
	Resolution	4 significant digits
	Relative Accuracy	±0.5 % reading ±1 digit
	TDS Factor Range	Linear 0.01 to 10.00, default 0.49
Dissolved Oxygen	**Concentration - Polarographic**	
	Range	0 to 90 mg/L
	Resolution	0.01, 0.1
	Relative Accuracy	±0.2
	% Saturation - Polarographic	
	Range	0 to 600
	Resolution	0.1, 1
	Relative Accuracy	±2 %
	Concentration - RDO	
	Range	0 to 50 mg/L
	Resolution	0.01, 0.1
	Relative Accuracy	±0.1 mg/L up to 8 mg/L; ±0.2 mg/L from 8 to 20 mg/L; 10 % of reading from 20 to 50 mg/L
	% Saturation - RDO	
	Range	0 to 500
	Resolution	0.1, 1
	Relative Accuracy	±2 %
	Automatic Barometric Pressure Correction	450.0 to 850.0 mm Hg
	Salinity Factor Correction	Automatic with separate conductivity probe or manual; 0 to 45 ppt
	Calibration Features	Water-saturated air, air saturated water, manual (Winkler) and zero point
	Probe Characteristics	Polarographic or RDO
Temperature	**Range**	-5 to 105 °C, 23 to 221 °F (0 to 50 °C, 32 to 122 °F with RDO)
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Datalogging	**Number of Datalogs**	5000 with time and date stamp
	Log Function	Manual, ready (includes AUTO-READ™), timed
Inputs	**pH Electrode**	BNC, reference pin
	Conductivity with Temperature Probe or ATC Probe	8-pin mini-DIN
	DO with Temperature Probe	9-pin mini-DIN
Output		RS232, USB
Power	**AC Adapter**	Optional – universal, 100-240 VAC
	Battery Power	Included – 4 AAs
	Battery Life	800 hrs

Meter Ordering Information

Cat. No.	Description
STARA3290	**Orion Star A329 pH/ISE/Conductivity/Dissolved Oxygen Portable Multiparameter Meter** - Four AA batteries (installed)
STARA3295	**Orion Star A329 pH/ISE/Conductivity/Dissolved Oxygen Portable Multiparameter Meter Kit** - 8107UWMMD Orion ROSS Triode 3-in-1 pH/ATC probe, 3m cable - 013010MD Orion DuraProbe conductivity cell, 3m cable - 087010MD Orion RDO optical/luminescence-based probe with 3m cable, stainless steel guard, calibration sleeve and optical/luminescence-based cap - 910410 Orion pH 4.01 buffer, 10 pouches - 910710 Orion pH 7.00 buffer, 10 pouches - 911010 Orion pH 10.01 buffer, 10 pouches - 810001 Orion ROSS electrode storage solution, 475 mL - 01100710 Orion 1413 µS conductivity standard, 10 pouches - 911110 rinse solution, 10 pouches - Protective armor with probe holders - Hard carrying case - Four AA batteries (installed)

Accessories

Cat. No.	Description
STARA-CS	Hard carrying case for Orion Star A-series portable meters
1210005	Soft carrying case for Orion Star, Star Plus and Star A-series portable meters
STARA-AR	Armor for Orion Star A-series portable meters, includes electrode holders for pH, conductivity and DO probes
STARA-ESPH	pH electrode holder for Orion Star A-series armor
STARA-ESCD	Conductivity and DO probe holder for Orion Star A-series armor
1010003	Optional universal power adapter, 100-240 V, 50/60 Hz
8107UWMMD	Orion ROSS Triode 3-in-1 pH/ATC probe, gel-filled, 3m cable
910410	Orion pH 4.01 buffer pouches, 10/pk
910710	Orion pH 7.00 buffer pouches, 10/pk
911010	Orion pH 10.01 buffer pouches, 10/pk
911110	Orion pH rinse solution pouches, 10/pk
013010MD	Orion DuraProbe conductivity cell with 3m cable, 4-cell, K=0.475
013020MD	Orion DuraProbe conductivity cell with 6m cable, 4-cell, K=0.475
013025MD	Orion DuraProbe conductivity cell with 10m cable, 4-cell, K=0.475
011008	Orion conductivity standard, 100 µS/cm, 5 x 60 mL bottles
01100710	Orion conductivity standard pouches, 1413 µS/cm, 10/pk
01100610	Orion conductivity standard pouches, 12.9 mS/cm, 10/pk
1010001	Orion conductivity calibration resistor kit
087010MD	Orion RDO optical DO probe, 3m cable with stainless steel guard and calibration sleeve
087020MD	Orion RDO optical DO probe, 6m cable with stainless steel guard and calibration sleeve
087030MD	Orion RDO optical DO probe, 10m cable with stainless steel guard and calibration sleeve
087050MD	Orion RDO optical DO probe, 15m cable with stainless steel guard and calibration sleeve
087100MD	Orion RDO optical DO probe, 30m cable with stainless steel guard and calibration sleeve
083005MD	Orion polarographic DO probe, 1.5m cable
080513	Orion polarographic DO probe maintenance kit
080514	Orion polarographic DO probe electrolyte solution, 60 mL
080017	Calibration sleeve for Orion polarographic DO probes
087003	Replacement calibration sleeve for Orion RDO optical probes
087001	Replacement optical cap for Orion RDO probes

pH
ISE
ORP
Cond
RDO
DO
Temp



Thermo Scientific Orion Star A324

pH/ISE Portable Meter

The Thermo Scientific Orion Star A324 pH/ISE Portable Meters is the top choice for advanced pH/ISE measurements on location. Get the information you need quickly and easily from the large, backlit graphic LCD display. Informative display shows pH/mV/RmV and temperature along with electrode status, time, date, sample ID, user ID and calibration points. Advanced features such as stability and averaging options provide additional options allowing for laboratory accuracy everywhere you need it.



Features and Benefits

- Anyone can use this meter with its plain language screen prompts, soft keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen, ready indicator alerts when readings are stable and timed reading gathers data in specific time intervals
- Up to 5 point pH calibration with automatic recognition for USA/NIST and DIN buffers
- Whether you use ISE infrequently or have multiple samples every day – up to 5 point ISE calibration with advanced features such as timed end point, linear point-to-point, non-linear selectable auto-blank and low-concentration range stability
- Fix errors without a complete recalibration with the calibration editing function
- Non-volatile memory holds up to 5000 data points with time and date stamp
- User and sample ID fields for additional data accuracy
- Stores up to 10 methods allow for customized procedures to differentiate between tests and/or users
- Easily transfer data and keep meter software up-to-date with the USB and RS232 ports and complimentary data analysis software
- Four AA batteries (included) provide over 800 hours of operation or purchase the universal power adapter (sold separately) to use AC power
- Perfectly portable, waterproof and protected to take anywhere with a IP67-rated housing
- 3 year meter replacement warranty



Product Specifications

		CE | TUV | FCC
pH	Range	-2.000 to 20.000
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	±0.002
	Calibration Points	Up to 5
	Calibration Editing	Yes
mV/Rel mV/ ORP	Range	±2000.0 mV
	Resolution	0.1
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	E_H ORP Mode	Yes
ISE	Range	0 to 19999
	Resolution	Up to 3 significant digits
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	Units	ppm, M, mg/L, %, ppb, none
	Calibration Points	Up to 5
	Calibration Editing	Yes
	Calibration Features	Timed end point, linear point to point, non-linear selectable auto-blank, low concentration range stability
Temperature	Range	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Datalogging	Number of Datalogs	5000 with time and date stamp
	Log Function	Manual, ready (include AUTO-READ™), timed
Inputs	pH Electrode	BNC, reference pin
	ATC Probe	8-pin mini-DIN
Output		RS232, USB
Power	AC Adapter	Optional – universal, 100-240 VAC
	Battery Power	Included – 4 AAs
	Battery Life	800 hrs

Meter Ordering Information

Cat. No.	Description
STARA3240	**Orion Star A324 pH/ISE Portable Meter** - Four AA batteries (installed)
STARA3245	**Orion Star A324 pH/ISE Portable Meter Kit** - 8107UWMMD Orion ROSS Triode 3-in-1 pH/ATC Probe - Orion pH 4, 7 and 10 buffers, 10 pouches of each value - 810001 Orion ROSS electrode storage solution - 911110 Rinse solution, 10 pouches - Protective armor with electrode holder - Hard carrying case - Four AA batteries (installed)

Accessories

Cat. No.	Description
STARA-CS	Hard carrying case for Orion Star A-series portable meters
1210005	Soft carrying case for Orion Star, Star Plus and Star A-series portable meters
STARA-AR	Armor for Orion Star A-series portable meters, includes electrode holders for pH, conductivity and DO probes
STARA-ESPH	pH electrode holder for Orion Star A-series armor
STARA-ESCD	Conductivity and DO probe holder for Orion Star A-series armor
8107UWMMD	Orion ROSS Triode 3-in-1 pH/ATC probe, gel-filled, 3m cable
1010003	Optional universal power adapter, 100-240 V, 50/60 Hz
910410	Orion pH 4.01 buffer pouches, 10/pk
910710	Orion pH 7.00 buffer pouches, 10/pk
911010	Orion pH 10.01 buffer pouches, 10/pk
911110	Orion pH rinse solution pouches, 10/pk
9512HPBNWP	Orion high-performance ammonia ISE
9512BNWP	Orion standard ammonia ISE
951007	Ammonia standard, 1000 ppm, 475 mL
951210	Low-level ammonia ISA
951211	Ammonia ISA, 475 mL
951209	Fill solution for Orion high-performance ammonia ISE, 60 mL
951202	Fill Solution for standard ammonia ISE , 60 mL
951213	Ammonia ISE storage solution
9609BNWP	Orion fluoride combination ISE
040906	Fluoride standard, 1 ppm with TISAB II, 475 mL
040907	Fluoride standard, 2 ppm with TISAB II, 475 mL
040908	Fluoride standard, 10 ppm with TISAB II, 475 mL
940909	TISAB II, 1 gallon
8611BNWP	Orion ROSS sodium combination ISE

Thermo Scientific Orion Star A325

pH/Conductivity Portable Meter

The Thermo Scientific Orion Star A325 pH/Conductivity Portable Meter is the top choice for advanced pH and conductivity measurements on location. Get the information you need quickly and easily from the large, backlit graphic LCD display. Informative display shows individual pH/mV/RmV or conductivity/TDS/salinity/resistivity results with temperature, or all results at once. Additional helpful information include electrode status, time, date, sample ID, user ID and calibration points. Advanced features such as stability and averaging options provide additional options allowing for laboratory accuracy everywhere you need it.

Features and Benefits

- Anyone can use this meter with its plain language screen prompts, soft keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen, ready indicator alerts when readings are stable and timed reading gathers data in specific time intervals
- Up to 5 point pH calibration with automatic recognition for USA/NIST and DIN buffers
- Fix pH calibration errors without a complete recalibration with calibration editing
- Selectable cell constant allows for use with 2- or 4-cell conductivity cells
- For advanced accuracy in conductivity readings, selectable reading reference temperatures of 5, 10, 15, 20 or 25 ºC with linear, non-linear, nLFu or USP/EP curve options
- Choice of practical salinity or natural sea water curves for salinity readings
- Linear or ISO/EN 27888 curves for TDS
- Non-volatile memory holds up to 5000 data points with time and date stamp
- User and sample ID fields for additional data accuracy
- Stores up to 10 methods allow for customized procedures to differentiate between tests and/or users
- Easily transfer data and keep meter software up-to-date with the USB and RS232 ports and complimentary data analysis software
- Four AA batteries (included) provide over 800 hours of operation or purchase the universal power adapter (sold separately) to use AC power
- Perfectly portable, waterproof and protected to take anywhere with a IP67-rated housing
- 3 year meter replacement warranty





Product Specifications

		CE | TUV | FCC
pH	Range	-2.000 to 20.000
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	±0.002
	Calibration Points	Up to 5
	Calibration Editing	Yes
mV/Rel mV/ ORP	Range	±2000.0 mV
	Resolution	0.1
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	E_H ORP Mode	Yes
Conductivity	Range	0.001 µS to 3000 mS
	Resolution	0.001 µS minimum; 4 significant figures minimum
	Relative Accuracy	0.5 % reading ±1 digit
	Reference Temperature	5, 10, 15, 20, 25 °C (default)
	Temperature Compensation	Linear (0 to 10.0 %/°C), nLn, nLFu, USP/EP
	Compatible Cell Constants	0.001 to 199.9
	Calibration Points	Up to 5 points
	Calibration Editing	Yes
Resistivity	Range	2 ohm to 100 meg-ohm
	Resolution	2 ohms-cm
	Relative Accuracy	0.5 % reading ±1 digit
Salinity	Type	Practical salinity or natural sea water
	Range	0.01 to 80.0 ppt NaCl equivalent; 0.01 to 42 ppt sea water
	Resolution	0.01
	Relative Accuracy	±0.1
TDS	Range	0 to 200 ppt
	Resolution	4 significant digits
	Relative Accuracy	±0.5 % reading ±1 digit
	TDS Factor Range	Linear 0.01 to 10.00, default 0.49
Temperature	Range	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Datalogging	Number of Datalogs	5000 with time and date stamp
	Log Function	Manual, ready (include AUTO-READ™), timed
Inputs	pH Electrode	BNC, reference pin
	Conductivity with Temperature Probe or ATC Probe	8-pin mini-DIN
Output		RS232, USB
Power	AC Adapter	Optional – universal, 100-240 VAC
	Battery Power	Included – 4 AAs
	Battery Life	800 hrs

Meter Ordering Information

Cat. No.	Description
STARA3250	**Orion Star A325 pH/Conductivity Portable Multiparameter Meter** - Four AA batteries (installed)
STARA3255	**Orion Star A325 pH/Conductivity Portable Multiparameter Meter Kit** - 8107UWMMD Orion ROSS Triode 3-in-1 pH/ATC probe, 3m cable - 013010MD Orion DuraProbe conductivity cell, 3m cable - 910410 Orion pH 4.01 buffer, 10 pouches - 910710 Orion pH 7.00 buffer, 10 pouches - 911010 Orion pH 10.01 buffer, 10 pouches - 810001 Orion ROSS electrode storage solution, 475 mL - 01100710 Orion 1413 µS conductivity standard, 10 pouches - 911110 rinse solution, 10 pouches - Protective armor with electrode holder - Hard carrying case - Four AA batteries (installed)

Accessories

Cat. No.	Description
STARA-CS	Hard carrying case for Orion Star A-series portable meters
STARA-AR	Armor for Orion Star A-series portable meters, includes electrode holders for pH, conductivity and DO probes
STARA-ESPH	pH electrode holder for Orion Star A-series armor
STARA-ESCD	Conductivity and DO probe holder for Orion Star A-series armor
8107UWMMD	Orion ROSS Triode 3-in-1 pH/ATC probe, gel-filled, 3m cable
013010MD	Orion DuraProbe conductivity cell with 3m cable, 4-cell, K=0.475
1010003	Optional universal power adapter, 100-240 V, 50/60 Hz
910410	Orion pH 4.01 buffer pouches, 10/pk
910710	Orion pH 7.00 buffer pouches, 10/pk
911010	Orion pH 10.01 buffer pouches, 10/pk
911110	Orion pH rinse solution pouches, 10/pk
011008	Orion conductivity standard, 100 µS/cm, 5 x 60 mL bottles
01100710	Orion conductivity standard pouches, 1413 µS/cm, 10/pk
01100610	Orion conductivity standard pouches, 12.9 mS/cm, 10/pk
1010001	Orion conductivity calibration resistor kit

Keep going to find more portable meters.

pH
ISE
ORP
Cond
RDO
DO
Temp



Thermo Scientific Orion Star A326

pH/RDO/Dissolved Oxygen Portable Meter

The Thermo Scientific Orion Star A326 pH/RDO/Dissolved Oxygen Portable Meter is the top choice for advanced pH and dissolved oxygen measurements on location. Get the information you need quickly and easily from the large, backlit graphic LCD display. Informative display shows individual pH/mV/RmV or dissolved oxygen in percent saturation or concentration results with temperature, or all results at once. Additional helpful information include electrode status, time, date, sample ID, user ID and calibration points. Advanced features such as stability and averaging options provide additional options allowing for laboratory accuracy everywhere you need it.



Features and Benefits

- Anyone can use this meter with its plain language screen prompts, soft keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen, ready indicator alerts when readings are stable and timed reading gathers data in specific time intervals
- Up to 5 point pH calibration with automatic recognition for USA/NIST and DIN buffers
- Fix pH calibration errors without a complete recalibration with calibration editing
- No need to worry about DO probe compatibility – the meter accepts and automatically recognizes Orion polarographic and RDO optical/luminescence-based probes
- Easily get accurate DO results with automatic temperature, manual salinity and automatic/manual barometric pressure correction
- Calibrate DO using water-saturated air, air-saturated water, a Winkler titration or zero point calibration
- Non-volatile memory holds up to 5000 data points with time and date stamp
- User and sample ID fields for additional data accuracy
- Stores up to 10 methods allow for customized procedures to differentiate between tests and/or users
- Easily transfer data and keep meter software up-to-date with the USB and RS232 ports and complimentary data analysis software
- Four AA batteries (included) provide over 800 hours of operation or purchase the universal power adapter (sold separately) to use on AC power
- Perfectly portable, waterproof and protected to take anywhere with a IP67-rated housing
- 3 year meter replacement warranty



Product Specifications

		CE | TUV | FCC
pH	Range	-2.000 to 20.000
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	±0.002
	Calibration Points	Up to 5
	Calibration Editing	Yes
mV/Rel mV/ ORP	Range	±2000.0 mV
	Resolution	0.1
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	E_H ORP Mode	Yes
Dissolved Oxygen	**Concentration - Polarographic**	
	Range	0 to 90 mg/L
	Resolution	0.01, 0.1
	Relative Accuracy	±0.2
	% Saturation - Polarographic	
	Range	0 to 600
	Resolution	0.1, 1
	Relative Accuracy	±2 %
	Concentration - RDO	
	Range	0 to 50 mg/L
	Resolution	0.01, 0.1
	Relative Accuracy	±0.1 mg/L up to 8 mg/L; ±0.2 mg/L from 8 to 20 mg/L; 10 % of reading from 20 to 50 mg/L
	% Saturation - RDO	
	Range	0 to 500
	Resolution	0.1, 1
	Relative Accuracy	±2 %
	Manual Barometric Pressure Correction	450.0 to 850.0 mm Hg
	Manual Salinity Factor Correction	0 to 45 ppt
	Calibration Features	Water-saturated air, air saturated water, manual (Winkler) and zero point
	Probe Characteristics	Polarographic or RDO
Temperature	Range	0 to 50 °C, 32 to 122 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Datalogging	Number of Datalogs	5000 with time and date stamp
	Log Function	Manual, ready (includes AUTO-READ™), timed
Inputs	pH Electrode	BNC, reference pin
	DO with Temp. Probe	9-pin mini-DIN
Output		RS232, USB
Power	AC Adapter	Optional – universal, 100-240 VAC
	Battery Power	Optional – 4 AAs
	Battery Life	800 hrs

Meter Ordering Information

Cat. No.	Description
STARA3260	**Orion Star A326 pH/RDO/Dissolved Oxygen Portable Multiparameter Meter** - Four AA batteries (installed)
STARA3265	**Orion Star A326 pH/RDO/Dissolved Oxygen Portable Multiparameter Meter Kit** - 8107UWMMD Orion ROSS Triode 3-in-1 pH/ATC probe, 3m cable - 087010MD Orion RDO optical/luminescence-based probe with 3m cable, stainless steel guard, calibration sleeve and optical/luminescence-based cap - 910410 Orion pH 4.01 buffer, 10 pouches - 910710 Orion pH 7.00 buffer, 10 pouches - 911010 Orion pH 10.01 buffer, 10 pouches - 810001 Orion ROSS electrode storage solution, 475 mL - 01100710 Orion 1413 µS conductivity standard, 10 pouches - 911110 rinse solution, 10 pouches - Protective armor with electrode holder - Hard carrying case - Four AA batteries (installed)

Accessories

Cat. No.	Description
STARA-CS	Hard carrying case for Orion Star A-series portable meters
STARA-AR	Armor for Orion Star A-series portable meters, includes electrode holders for pH, conductivity and DO probes
STARA-ESPH	pH electrode holder for Orion Star A-series armor
STARA-ESCD	Conductivity and DO probe holder for Orion Star A-series armor
8107UWMMD	Orion ROSS Triode 3-in-1 pH/ATC probe, gel-filled, 3m cable
087020MD	Orion RDO optical DO probe, 6m cable with stainless steel guard and calibration sleeve
087030MD	Orion RDO optical DO probe, 10m cable with stainless steel guard and calibration sleeve
087050MD	Orion RDO optical DO probe, 15m cable with stainless steel guard and calibration sleeve
087100MD	Orion RDO optical DO probe, 30m cable with stainless steel guard and calibration sleeve
1010003	Optional universal power adapter, 100-240 V, 50/60 Hz
910410	Orion pH 4.01 buffer pouches, 10/pk
910710	Orion pH 7.00 buffer pouches, 10/pk
911010	Orion pH 10.01 buffer pouches, 10/pk
911110	Orion pH rinse solution pouches, 10/pk
087010MD	Orion RDO optical DO probe, 3m cable with stainless steel guard and calibration sleeve
083005MD	Orion polarographic DO probe, 1.5m cable

pH
ISE
ORP
Cond
RDO
DO
Temp



Thermo Scientific Orion Star A321 & Star A221

pH Portable Meters

Orion Star A321

The Thermo Scientific Orion Star A321 pH Portable Meter is the top choice for advanced pH measurements on location. Get the information you need quickly and easily from the large, backlit graphic LCD display. Informative display shows pH/mV/RmV and temperature along with electrode status, time, date, sample ID, user ID and calibration points. Advanced features such as stability and averaging options provide additional options allowing for laboratory accuracy everywhere you need it.



Features and Benefits

- Anyone can use this meter with its plain language screen prompts, soft keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen, ready indicator alerts when readings are stable and timed reading gathers data in specific time intervals
- Up to 5 point pH calibration with automatic recognition for USA/NIST and DIN buffers
- Fix errors without a complete recalibration with calibration editing
- Non-volatile memory holds up to 5000 data points with time and date stamp
- User and sample ID fields for additional data accuracy
- Stores up to 10 methods allow for customized procedures to differentiate between tests and/or users
- Easily transfer data and keep meter software up-to-date with the USB and RS232 ports and complimentary data analysis software
- Four AA batteries (included) provide over 800 hours of operation or purchase the universal power adapter (sold separately) to use AC power
- Perfectly portable, waterproof and protected to take anywhere with a IP67-rated housing
- 3 year meter replacement warranty



Orion Star A221

Get the readings that you need where you need them with the Thermo Scientific Orion Star A221 pH Portable Meter. The large, backlit graphic LCD display shows pH/mV/RmV and temperature along with electrode status, time, date and calibration points.

Features and Benefits

- Anyone can use this meter with its plain language screen prompts, soft keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen and ready indicator alerts when readings are stable
- Up to 5 point pH calibration with automatic recognition for USA/NIST and DIN buffers
- Non-volatile memory holds up to 1000 data points with time and date stamp
- Easily transfer data and keep meter software up-to-date with the USB and RS232 ports and complimentary data analysis software
- Four AA batteries (included) provide over 800 hours of operation or purchase the universal power adapter (sold separately) to use AC power
- Perfectly portable, waterproof and protected to take anywhere with a IP67-rated housing
- 3 year meter replacement warranty



Product Specifications (Orion Star A321 & Star A221)

CE | TUV | FCC

pH	**Range**	-2.000 to 20.000
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	±0.002
	Calibration Points	Up to 5
	Calibration Editing	Orion Star A321: Yes Orion Star A221: No
mV/Rel mV/ ORP	**Range**	±2000.0 mV
	Resolution	0.1
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	E_H ORP Mode	Yes
Temperature	**Range**	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Datalogging	**Number of Datalogs**	Orion Star A321: 5000 with time and date stamp Orion Star A221: 1000 with time and date stamp
	Log Function	Orion Star A321: Manual, ready (includes AUTO-READ™), timed Orion Star A221: Manual, Automatic with AUTO-READ™
Inputs	**pH Electrode**	BNC, reference pin
	ATC Probe	8-pin mini-DIN
Output		RS232, USB
Power	**AC Adapter**	Optional – universal, 100-240 VAC
	Battery Power	Included – 4 AAs
	Battery Life	800 hrs

Meter Ordering Information

Cat. No.	Description
STARA3210	**Orion Star A321 pH Portable Meter** - Four AA batteries (installed)
STARA3215	**Orion Star A321 pH Portable Meter Kit** - 8107UWMMD Orion ROSS Triode 3-in-1 pH/ATC probe - 910410 Orion pH 4.01 buffer, 10 pouches - 910710 Orion pH 7.00 buffer, 10 pouches - 911010 Orion pH 10.01 buffer, 10 pouches - 810001 Orion ROSS electrode storage solution, 475 mL - 911110 rinse solution, 10 pouches - Protective armor with electrode holder - Hard carrying case - Four AA batteries (installed)
STARA2210	**Orion Star A221 pH Portable Meter** - Four AA batteries (installed)
STARA2215	**Orion Star A221 pH Portable Meter Kit** - 8107UWMMD Orion ROSS Triode 3-in-1 pH/ATC probe - 910410 Orion pH 4.01 buffer, 10 pouches - 910710 Orion pH 7.00 buffer, 10 pouches - 911010 Orion pH 10.01 buffer, 10 pouches - 810001 Orion ROSS electrode storage solution, 475 mL - 911110 rinse solution, 10 pouches - Protective armor with electrode holder - Hard carrying case - Four AA batteries (installed)

Accessories

Cat. No.	Description
STARA-CS	Hard carrying case for Orion Star A-series portable meters
STARA-AR	Armor for Orion Star A-series portable meters, includes electrode holders for pH, conductivity and DO probes
STARA-ESPH	pH electrode holder for Orion Star A-series armor
STARA-ESCD	Conductivity and DO probe holder for Orion Star A-series armor
8107UWMMD	Orion ROSS Triode 3-in-1 pH/ATC probe, gel-filled, 3m cable
1010003	Optional universal power adapter, 100-240 V, 50/60 Hz
910410	Orion pH 4.01 buffer pouches, 10/pk
910710	Orion pH 7.00 buffer pouches, 10/pk
911010	Orion pH 10.01 buffer pouches, 10/pk
911110	Orion pH rinse solution pouches, 10/pk

We told you we've expanded the line. The new Orion Star A series line still has more options on the following pages.

pH
ISE
ORP
Cond
RDO
DO
Temp

Thermo Scientific Orion Star A121

pH Portable Meter

Thermo Scientific Orion Star A121 pH Portable Meters combine simplicity with accuracy. A large LCD displays pH or mV readings along with temperature. Icons provide quick updates on battery life, electrode status and calibration information. Simple button layout and onscreen messages help with calibration and setup menu choices.



Features and Benefits

- Large, informative screen clearly shows the main information, including pH or mV reading, temperature in ºC or ºF, meter mode, calibration information and battery life
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen and ready indicator alerts when readings are stable
- Up to 3 point pH calibration
- Automatic recognition of USA/NIST and DIN buffers
- Easily recall calibration slope data for procedure checks
- Non-volatile memory holds up to 50 data points
- Four AA batteries (included) provide over 2000 hours of operation or purchase the universal power adapter (sold separately) to run meter on AC power
- Perfectly portable, waterproof and protected to take anywhere with a IP67-rated housing
- 3 year meter replacement warranty



Product Specifications

		CE | TUV | FCC
pH	Range	-2.00 to 16.00
	Resolution	0.1, 0.01
	Relative Accuracy	±0.01
	pH Calibration Points	Up to 3
mV/Rel mV/ ORP	Range - mV	±1600.0 mV
	Range - RmV	±1999.9 mV
	Resolution	0.1
	Relative Accuracy	±0.2 mV or ±0.05 % of reading whichever is greater
	E_H ORP Mode	No
Temperature	Range	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Temperature Compensation	Automatic or manual
	Temperature Offset Calibration	Yes
Datalogging	Number of Datalogs	50
	Log Function	Manual, Automatic with AUTO-READ™
Inputs	pH Electrode	BNC
	ATC Probe	8-pin mini-DIN
Power	AC Adapter	Optional – universal, 100-240 VAC
	Battery Power	Included – 4 AAs
	Battery Life	2000 hrs

Meter Ordering Information

Cat. No.	Description
STARA1210	**Orion Star A121 pH Portable Meter** - Four AA batteries (installed)
STARA1215	**Orion Star A121 pH Portable Meter Kit** - 9107BNMD Orion Triode 3-in-1 pH/ATC probe - Solution kit (60 mL each of pH 4, 7 and 10 buffers; storage solution and cleaning solution) - 911110 rinse solution, 10 pouches - Protective armor with electrode holder - Hard carrying case - Four AA batteries (installed)

Accessories

Cat. No.	Description
STARA-CS	Hard carrying case for Orion Star A-series portable meters
STARA-AR	Armor for Orion Star A-series portable meters, includes electrode holders for pH, conductivity and DO probes
STARA-ESPH	pH electrode holder for Orion Star A-series armor
STARA-ESCD	Conductivity and DO probe holder for Orion Star A-series armor
9157BNMD	Orion Triode 3-in-1 pH/ATC probe, refillable, epoxy body
9107BNMD	Orion Triode 3-in-1 pH/ATC probe, gel-filled, epoxy body
1010003	Optional universal power adapter, 100-240 V, 50/60 Hz
910410	Orion pH 4.01 buffer pouches, 10/pk
910710	Orion pH 7.00 buffer pouches, 10/pk
911010	Orion pH 10.01 buffer pouches, 10/pk
911110	Orion pH rinse solution pouches, 10/pk
916099	Orion pH buffer assortment pack - 60 mL each of pH 4, 7 and 10 buffers; storage solution and cleaning solution D



Thermo Scientific Orion Star A322 & Star A222

Conductivity Portable Meters

Orion Star A322

The Thermo Scientific Orion Star A322 Conductivity Portable Meter is the top choice for advanced measurements on location. Get the information you need quickly and easily from the large, backlit graphic LCD display. Informative display shows conductivity/TDS/salinity resistivity and temperature along with electrode status, time, date, sample ID, user ID and calibration points. Advanced features such as stability and averaging options provide additional options allowing for laboratory accuracy everywhere you need it.



Features and Benefits

- Anyone can use this meter with its plain language screen prompts, soft keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen, ready indicator alerts when readings are stable and timed reading gathers data in specific time intervals
- Selectable cell constant allows for use with 2- or 4-cell conductivity cells
- For advanced accuracy, selectable reading reference temperatures of 5, 10, 15, 20 or 25 ºC with linear, non-linear, nLFu or USP/EP curve options
- Choice of practical salinity or natural sea water curves for salinity readings
- Linear or ISO/EN 27888 curves for TDS
- Non-volatile memory holds up to 5000 data points with time and date stamp
- User and sample ID fields for additional data accuracy
- Stores up to 10 methods allow for customized procedures to differentiate between tests and/or users
- Easily transfer data and keep meter software up-to-date with the USB and RS232 ports and complimentary data analysis software
- Four AA batteries (included) provide over 800 hours of operation or purchase the universal power adapter (sold separately) to use AC power
- Perfectly portable, waterproof and protected to take anywhere with a IP67-rated housing
- 3 year meter replacement warranty

Orion Star A222

Get the readings that you need where you need them with the Thermo Scientific Orion Star A222 Conductivity Portable Meter. The large, backlit graphic LCD display shows conductivity/TDS/salinity/resistivity and temperature along with electrode status, time, date and calibration points.

Features and Benefits

- Anyone can use this meter with its plain language screen prompts, soft keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen and ready indicator alerts when readings are stable
- Selectable cell constant allows for use with 2- or 4-cell conductivity cells
- Selectable reading reference temperatures of 15, 20 or 25 ºC with linear or non-linear curve options
- Includes the standard practical salinity curve for salinity readings
- Linear or ISO/EN 27888 curves for TDS
- Non-volatile memory holds up to 1000 data points with time and date stamp
- Easily transfer data and keep meter software up-to-date with the USB and RS232 ports and complimentary data analysis software
- Four AA batteries (included) provide over 800 hours of operation or purchase the universal power adapter (sold separately) to use AC power
- Perfectly portable, waterproof and protected to take anywhere with a IP67-rated housing
- 3 year meter replacement warranty





Product Specifications (Orion Star A322 & Star A222)

		CE | TUV | FCC
Conductivity	Range	0.001 µS to 3000 mS
	Resolution	0.001 µS minimum; 4 significant figures minimum
	Relative Accuracy	0.5 % reading ±1 digit
	Reference Temperature	Orion Star A322: 5, 10, 15, 20, 25 °C Orion Star A222: 15, 20, 25 °C
	Temperature Compensation	Orion Star A322: Linear (0 to 10.0 %/°C), nLn, nLFu, USP/EP Orion Star A222: Linear (0 to 10.0 %/°C), nLn
	Compatible Cell Constants	0.001 to 199.9
	Calibration Points	Up to 5 points
	Calibration Editing	Orion Star A322: Yes Orion Star A222: –
Resistivity	Range	2 ohm to 100 meg-ohm
	Resolution	2 ohms-cm
	Relative Accuracy	0.5 % reading ±1 digit
Salinity	Type	Orion Star A322: Practical salinity or natural sea water Orion Star A222: Practical salinity
	Range	0.01 to 80.0 ppt NaCl equivalent; 0.01 to 42 ppt sea water
	Resolution	0.01
	Relative Accuracy	±0.1
TDS	Range	0 to 200 ppt
	Resolution	4 significant digits
	Relative Accuracy	±0.5 % reading ±1 digit
	TDS Factor Range	Linear, 0.01 to 10.00
Temperature	Range	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Datalogging	Number of Datalogs	Orion Star A322: 5000 with time and date stamp Orion Star A222: 1000 with time and date stamp
	Log Function	Orion Star A322: Manual, ready (includes AUTO-READ™), timed Orion Star A222: Manual, Automatic with AUTO-READ™
Inputs	Conductivity with Temperature Probe	8-pin mini-DIN
Output		RS232, USB
Power	AC Adapter	Optional – universal, 100-240 VAC
	Battery Power	Included – 4 AAs
	Battery Life	800 hrs

Meter Ordering Information

Cat. No.	Description
STARA3220	**Orion Star A322 Conductivity Portable Meter** - Four AA batteries (installed)
STARA3225	**Orion Star A322 Conductivity Portable Meter Kit** - 013010MD Orion DuraProbe conductivity cell with 3m cable, K=0.475 - 01100710 conductivity standard pouches, 1413 µS, pack of 10 - 911110 rinse solution, pack of 10 - Protective armor with electrode holder - Hard carrying case - Four AA batteries (installed)
STARA2220	**Orion Star A222 Conductivity Portable Meter** - Four AA batteries (installed)
STARA2225	**Orion Star A222 Conductivity Portable Meter Kit** - 013010MD Orion DuraProbe conductivity cell with 3m cable, K=0.475 - 01100710 conductivity standard pouches, 1413 µS, pack of 10 - 911110 rinse solution, pack of 10 - Protective armor with electrode holder - Hard carrying case - Four AA batteries (installed)

Accessories

Cat. No.	Description
STARA-CS	Hard carrying case for Orion Star A-series portable meters
1210005	Soft carrying case for Orion Star, Star Plus and Star A-series portable meters
STARA-AR	Armor for Orion Star A-series portable meters, includes electrode holders for pH, conductivity and DO probes
STARA-ESCD	Conductivity and DO probe holder for Orion Star A-series armor
STARA-ESPH	pH electrode holder for Orion Star A-series armor
013005MD	Orion DuraProbe conductivity cell with 1.5m cable, 4-cell, K=0.475
013010MD	Orion DuraProbe conductivity cell with 3m cable, 4-cell, K=0.475
013020MD	Orion DuraProbe conductivity cell with 6m cable, 4-cell, K=0.475
013025MD	Orion DuraProbe conductivity cell with 10m cable, 4-cell, K=0.475
1010003	Optional universal power adapter, 100-240 V, 50/60 Hz
011008	Orion conductivity standard, 100 µS/cm, 5 x 60 mL bottles
01100710	Orion conductivity standard pouches, 1413 µS/cm, 10/pk
01100610	Orion conductivity standard pouches, 12.9 mS/cm, 10/pk
911110	Orion rinse solution pouches, 10/pk
1010001	Orion conductivity calibration resistor kit

That's not all. We have more new meters on the following pages.



Thermo Scientific Orion Star A122

Conductivity Portable Meter

Thermo Scientific Orion Star A122 Conductivity Portable Meters combine simplicity with accuracy. A large LCD displays conductivity or TDS readings along with temperature. Icons provide quick updates on battery life and completed calibration status. Simple button layout and onscreen messages help with calibration and setup menu choices.

Features and Benefits

- Large, informative screen clearly shows the main information, including conductivity or TDS reading, temperature in ºC or ºF, meter mode and battery life
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen and ready indicator alerts when readings are stable
- Selectable cell constant
- Manual calibration or automatic calibration when using a Thermo Scientific Orion conductivity standard (sold separately)
- Selectable reading reference temperatures of 20 ºC or 25 ºC for an accurate result
- Non-volatile memory holds up to 50 data points
- Four AA batteries (included) provide over 2000 hours of operation or purchase the universal power adapter (sold separately) to run meter on AC power
- Perfectly portable, waterproof and protected to take anywhere with a IP67-rated housing
- 3 year meter replacement warranty





Product Specifications

		CE | TUV | FCC
Conductivity	Range	0.1 µS/cm to 200 mS/cm
	Resolution	0.01 µS minimum; 3 significant figures minimum
	Relative Accuracy	0.5 % reading ±1 digit
	Reference Temperature	20, 25 °C (default)
	Temperature Compensation	Linear (0.0 to 10.0 %/°C)
	Compatible Cell Constants	0.001 to 10
	Calibration Points	1
TDS	Range	1 to 19,999 mg/L
	Resolution	4 significant digits
	Relative Accuracy	0.5 % reading ±1 digit
	TDS Factor Range	Linear, 0.01 to 10.00, default 0.49
Temperature	Range	-5 to 105 °C, 23 to 221 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	Yes
Datalogging	Number of Datalogs	50
	Log Function	Manual, Automatic with AUTO-READ™
Inputs	Conductivity	8-pin mini-DIN
Power	AC Adapter	Optional – universal, 100-240 VAC
	Battery Power	Included – 4 AAs
	Battery Life	2000 hrs

Meter Ordering Information

Cat. No.	Description
STARA1220	**Orion Star A122 Conductivity Portable Meter** - Four AA batteries (installed)
STARA1225	**Orion Star A122 Conductivity Portable Meter Kit** - 011050MD Orion conductivity cell, K=1.0 - 011007 conductivity standard, 1413 µS, 5 x 60 mL - 911110 rinse solution, 10 pouches - Protective armor with electrode holder - Hard carrying case - Four AA batteries (installed)

Accessories

Cat. No.	Description
STARA-CS	Hard carrying case for Orion Star A-series portable meters
STARA-AR	Armor for Orion Star A-series portable meters, includes electrode holders for pH, conductivity and DO probes
STARA-ESCD	Conductivity and DO probe holder for Orion Star A-series armor
STARA-ESPH	pH electrode holder for Orion Star A-series armor
011050MD	Orion 2-electrode conductivity cell, K=1.0
1010003	Optional universal power adapter, 100-240 V, 50/60 Hz
011008	Orion conductivity standard, 100 µS/cm, 5 x 60 mL bottles
01100710	Orion conductivity standard pouches, 1413 µS/cm, 10/pk
01100610	Orion conductivity standard pouches, 12.9 mS/cm, 10/pk
911110	Rinse solution, 10/pk
1010001	Orion conductivity calibration resistor kit



Thermo Scientific Orion Star A323 & Star A223

RDO/Dissolved Oxygen Portable Meters



Orion Star A323

The Thermo Scientific Orion Star A323 RDO/Dissolved Oxygen Portable Meter is the top choice for ensuring proper oxygen levels for maximum process control on location. Get the information you need quickly and easily from the large, backlit graphic LCD display. Informative display shows dissolved oxygen in percent saturation or concentration with temperature and electrode status, time, date, sample ID, user ID and calibration points. Advanced features such as stability and averaging options provide additional options allowing for laboratory accuracy everywhere you need it.

Features and Benefits

- Anyone can use this meter with its plain language screen prompts, soft keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- No need to worry about DO probe compatibility – the meter accepts and automatically recognizes Orion polarographic and RDO optical/luminescence-based probes
- Accurate results are easy with automatic temperature, manual salinity and automatic/manual barometric pressure compensation
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen, ready indicator alerts when readings are stable and timed reading gathers data in specific time intervals
- Calibrate using water-saturated air, air-saturated water, a Winkler titration or zero point calibration
- Non-volatile memory holds up to 5000 data points with time and date stamp
- User and sample ID fields for additional data accuracy
- Stores up to 10 methods allow for customized procedures to differentiate between tests and/or users
- Easily transfer data and keep meter software up-to-date with the USB and RS232 ports and complimentary data analysis software
- Four AA batteries (included) provide over 800 hours of operation or purchase the universal power adapter (sold separately) to use AC power
- Perfectly portable, waterproof and protected to take anywhere with a IP67-rated housing
- 3 year meter replacement warranty



Orion Star A223

Get the readings that you need where you need them with the Thermo Scientific Orion Star A223 RDO/Dissolved Oxygen Portable Meter. The large, backlit graphic LCD display shows dissolved oxygen in percent saturation or concentration with temperature and electrode status, time, date and calibration points.

Features and Benefits

- Anyone can use this meter with its plain language screen prompts, soft keys that update for easy selection and a multilanguage interface that supports English, Spanish, French, Italian, German and Chinese
- No need to worry about DO probe compatibility – the meter accepts and automatically recognizes Orion polarographic and RDO optical/luminescence-based probes
- Accurate results are easy with automatic temperature, manual salinity and automatic/manual barometric pressure compensation
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen and ready indicator alerts when readings are stable
- Calibrate using water-saturated air, air-saturated water, a Winkler titration or zero point calibration
- Non-volatile memory holds up to 1000 data points with time and date stamp
- Easily transfer data and keep meter software up-to-date with the USB and RS232 ports and complimentary data analysis software
- Four AA batteries (included) provide over 800 hours of operation or purchase the universal power adapter (sold separately) to use AC power
- Perfectly portable, waterproof and protected to take anywhere with a IP67-rated housing
- 3 year meter replacement warranty



Product Specifications (Orion Star A323 & Star A223)

CE | TUV | FCC

Dissolved Oxygen	**Concentration - Polarographic**	
	Range	0 to 90 mg/L
	Resolution	0.01, 0.1
	Relative Accuracy	±0.2
	% Saturation - Polarographic	
	Range	0 to 600
	Resolution	0.1, 1
	Relative Accuracy	±2 %
	Concentration - RDO	
	Range	0 to 50 mg/L
	Resolution	0.01, 0.1
	Relative Accuracy	±0.1 mg/L up to 8 mg/L; ±0.2 mg/L from 8 to 20 mg/L; 10 % of reading from 20 to 50 mg/L
	% Saturation - RDO	
	Range	0 to 500
	Resolution	0.1, 1
	Relative Accuracy	±2 %
	Manual Barometric Pressure Correction	450.0 to 850.0 mm Hg
	Manual Salinity Factor Correction	0 to 45 ppt
	Calibration Features	Water saturated air, air saturated water, manual (Winkler) and zero point
	Probe Characteristics	Polarographic or RDO
Temperature	**Range**	0 to 50 °C, 32 to 122 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	1 point
Datalogging	**Number of Datalogs**	Orion Star A323: 5000 with time and date stamp Orion Star A223: 1000 with time and date stamp
	Log Function	Orion Star A323: Manual, automatic (with Auto-Read™), timed Orion Star A223: Manual, automatic (with Auto-Read™)
Inputs	**DO with Temperature Probe**	9-pin mini-DIN
Output		RS232, USB
Power	**Power Cord**	Optional – universal, 100-240 VAC
	Battery Power	Included – 4 AAs
	Battery Life	800 hrs

Meter Ordering Information

Cat. No.	Description
STARA3230	**Orion Star A323 Dissolved Oxygen Portable Meter** - Four AA batteries (installed)
STARA3235	**Orion Star A323 Dissolved Oxygen Portable Meter Kit** - 087010MD Orion RDO optical/luminescence-based probe with 3m cable, stainless steel guard, calibration sleeve and optical/luminescence-based cap - Protective armor with electrode holder - Hard carrying case - Four AA batteries (installed)
STARA2230	**Orion Star A223 RDO/Dissolved Oxygen Portable Meter** - Four AA batteries (installed)
STARA2235	**Orion Star A223 RDO/Dissolved Oxygen Portable Meter Kit** - 087010MD Orion RDO optical/luminescence-based probe with 3m cable, stainless steel guard, calibration sleeve and optical/luminescence-based cap - Protective armor with electrode holder - Hard carrying case - Four AA batteries (installed)

Accessories

Cat. No.	Description
STARA-CS	Hard carrying case for Orion Star A-series portable meters
STARA-AR	Armor for Orion Star A-series portable meters, includes electrode holders for pH, conductivity and DO probes
STARA-ESCD	Conductivity and DO probe holder for Orion Star A-series armor
STARA-ESPH	pH electrode holder for Orion Star A-series armor
1010003	Optional universal power adapter, 100-240 V, 50/60 Hz
087010MD	Orion RDO optical DO probe, 3m cable with stainless steel guard and calibration sleeve
087020MD	Orion RDO optical DO probe, 6m cable with stainless steel guard and calibration sleeve
087030MD	Orion RDO optical DO probe, 10m cable with stainless steel guard and calibration sleeve
087050MD	Orion RDO optical DO probe, 15m cable with stainless steel guard and calibration sleeve
087100MD	Orion RDO optical DO probe, 30m cable with stainless steel guard and calibration sleeve
083005MD	Orion polarographic DO probe, 1.5m cable
080513	Orion polarographic DO probe maintenance kit
080514	Orion polarographic DO probe electrolyte solution, 60 mL
080017	Calibration sleeve for Orion polarographic DO probes
087003	Replacement calibration sleeve for Orion RDO optical probes
087001	Replacement optical cap for Orion RDO probes

Looking for more? Please turn the page.



Thermo Scientific Orion Star A123

Dissolved Oxygen Portable Meter

Thermo Scientific Orion Star A123 Dissolved Oxygen Portable Meters combine simplicity with accuracy. A large LCD displays dissolved oxygen readings along with temperature. Icons provide quick updates on battery life and completed calibration status. Simple button layout and onscreen messages help with calibration and setup menu choices.

Features and Benefits

- Large, informative screen clearly shows the main information, including DO reading in mg/L or % saturation, temperature in ºC or ºF, meter mode and battery life
- Automatic temperature, manual salinity input and manual barometric pressure compensation for an accurate result
- Don't miss a reading – AUTO-READ™ locks in the stable reading on your screen and ready indicator alerts when readings are stable
- Two calibration options to meet your procedural requirements: water-saturated air method or a Winkler titration
- Accepts Thermo Scientific Orion polarographic dissolved oxygen probes
- Non-volatile memory holds up to 50 data points
- Four AA batteries (included) provide over 2000 hours of operation or purchase the universal power adapter (sold separately) to run meter on AC power
- Perfectly portable, waterproof and protected to take anywhere with a IP67-rated housing
- 3 year meter replacement warranty



Product Specifications

CE | TUV | FCC

Dissolved Oxygen	**Concentration**	
	Range	0 to 20 mg/L
	Resolution	0.01, 0.1
	Relative Accuracy	±0.2
	% Saturation	
	Range	0 to 200
	Resolution	0.1, 1
	Relative Accuracy	±2 %
	Manual Barometric Pressure Correction	450.0 to 850.0 mm Hg
	Manual Salinity Factor Correction	0 to 45
	Calibration Features	Water-saturated air, manual (Winkler)
	Sensor Type	Polarographic
Temperature	Range	0 to 50 °C, 32 to 122 °F
	Resolution	0.1
	Relative Accuracy	±0.1
	Offset Calibration	Yes
Datalogging	Number of Datalogs	50
	Log Function	Manual, Automatic with AUTO-READ™
Inputs	DO with Temperature Probe	9-pin mini-DIN
Power	Power Cord	Optional – universal, 100-240 VAC
	Battery Power	Included – 4 AAs
	Battery Life	2000 hrs

Meter Ordering Information

Cat. No.	Description
STARA1230	**Orion Star A123 Dissolved Oxygen Portable Meter** - Four AA batteries (installed)
STARA1235	**Orion Star A123 Dissolved Oxygen Portable Meter Kit** - 083005MD Orion polarographic DO probe - 080017 calibration sleeve for DO probe - 080513 DO probe maintenance kit - Protective armor with electrode holder - Hard carrying case - Four AA batteries (installed)

Accessories

Cat. No.	Description
STARA-CS	Hard carrying case for Orion Star A-series portable meters
STARA-AR	Armor for Orion Star A-series portable meters, includes electrode holders for pH, conductivity and DO probes
STARA-ESCD	Conductivity and DO probe holder for Orion Star A-series armor
STARA-ESPH	pH electrode holder for Orion Star A-series armor
083005MD	Orion polarographic DO probe, 1.5 m cable
080513	Orion polarographic DO probe maintenance kit
080017	Calibration sleeve for Orion polarographic DO probes
1010003	Optional universal power adapter, 100-240 V, 50/60 Hz



Thermo Scientific Orion Meter Accessories

For Orion Star A and VERSA STAR Series

With the new Orion meters, no details were too small. Even our accessories have undergone a redesign.

Accessories

Cat. No.	Description
STARA-CS	Hard field case
1210005	Soft field case
STARA-AR	Armor for Orion Star A portable meters (includes pH electrode storage sleeve and holders for pH, conductivity and DO probes)
STARA-ESPH	Replacement pH electrode storage sleeve holder (for use with armor)
STARA-ESCD	Replacement conductivity and DO storage sleeves holder (for use with armor)
STARA-BEA	Orion Star A electrode arm and holder head
STARA-HB	Weighted, detached base for electrode arm and holder head
STARA-ELHD	Orion Star A electrode holder head (attaches to existing Orion Star electrode arm)
1010003	Universal power adapter (for Orion Star A benchtop and portable meters)
STARA-PWR	Replacement universal power adapter for Orion VERSA STAR
1010004	RS232 computer and printer cable set
1010006	Star series inkjet printer, 110V/220V and cable
1010008	Ink cartridge for Orion Star series printer
1010009	Paper for Orion Star series printer
1010053	RS232 computer cable
096019	Orion Star stirrer probe (automatic stirrer probe with paddle for benchtop Orion Star series meters)
096021	Replacement paddles for 096019 - 3 pack
090045	BNC shorting cap



The redesigned electrode holder head (cat. no. STARA-ELHD, sold separately or included with cat. no. STARA-BEA) reduces the amount of sample needed for testing since the probe heights are adjustable.



Armor (cat. no. STARA-AR) adds extra meter protection. The strap can attach to a belt or pipe to keep the meter close to the tester or test site. The built-in stand in the armor works great for additional hands-free operation.





Thermo Scientific Orion Meter Accessories

For Orion Star, Star Plus, Aplus and PerpHecT Meter Series

To make sure you have everything you need to attain accurate results for your applications, we offer a multitude of accessories for both field and lab applications. From printers to field cases, electrode stands and stirrers, we have it all. Below are the top selling accessories – for complete details, please visit **www.thermoscientific.com/water**.

Aplus™ and PerpHecT® Meter Accessories

Cat. No.	Description
020125	110 V power adapter
020130	220 V power adapter
020135	240 V power adapter
090043	Swing arm electrode stand
090070	Basic electrode stand and holder
910002	Universal electrode holder for basic electrode stand
090045	BNC shorting cap
0900A0	900A thermal printer for Aplus meters, 110 V
0900A1	900A thermal printer for Aplus meters, 220 V
0900A7	900A thermal printer for Aplus meters, 240 V
0900A4	Paper for 900A printer
0900A6	Battery pack for 900A printer
PRT300	PRT300 ink printer and cable for Aplus and PerpHecT meters, 110 V
PRT301	PRT300 ink printer and cable for Aplus and PerpHecT meters, 220 V
PRT302	Ink ribbon for PRT300 printer
0ACBL0	RS232 computer cable for Aplus and PerpHecT meters
0PBLSK	Aplus portable meter starter kit – includes field case, field stand, beaker, 2 x 60 mL bottles each of pH 4.01, 7.00, and 10.01 buffers, and 1 x 60 mL bottle of pH storage solution
0BCHSK	Aplus benchtop meter starter kit – includes basic electrode stand and holder, 917005 epoxy ATC probe, and 1 x 475 mL bottle each of pH 4.01, 7.00, and 10.01 buffers and pH storage solution
0607CA	607 multi-channel electrode switchbox and cables, 110 V
0607CI	607 multi-channel electrode switchbox and cables, 220 V



Hard Field Case, Cat. No. 1210004



Soft Field Case, Cat. No. 1210005

Orion Star™ Series Meter Accessories

Cat. No.	Description
1010003	Universal power adapter
1010004	RS232 computer and printer cable set
1010005	RS232 to USB cable adapter
1010006	Orion Star series inkjet printer, 110 V/220 V and cable
1010008	Ink cartridge for Orion Star series printer
1010009	Paper for Orion Star series printer
1010053	RS232 computer cable
1210001	Portable star series electrode stand
1210002	Meter impact jacket and electrode storage chamber
1210003	Electrode storage chamber (for meter impact jacket)
1210004	Hard field case
1210005	Soft field case
096019	Orion Star stirrer probe (automatic stirrer probe with paddle for benchtop Orion Star series meters)
096021	Replacement paddles for 096019 – 3 pack
090043	Swing arm electrode stand
090044	Electrode holder head with 15mm dia cond cell slot, for use with 090043
090045	BNC shorting cap
1010050	Adapter – MiniDIN ATC probe to 3.5 mm phono tip meters (310, 320, 330, 350, 370, 555A, 550A, 535A, and 162A)
1010051	Adapter – MiniDIN ATC probe to 8 pin DIN meters (210Aplus, 230Aplus, 250Aplus, 290Aplus, 410Aplus, 420Aplus, 520Aplus, 525Aplus, 710Aplus, 720Aplus, and 920Aplus)
1010800	Adapter – MiniDIN DO probe to 8 pin waterproof DIN DO meters (830A, 835A and 862A)
1010801	Adapter – MiniDIN DO probe to 8 pin DIN DO meters (805Aplus, 810Aplus, and 850Aplus)
1010900	Adapter – MiniDIN conductivity probe to 8 pin waterproof DIN conductivity meters (1230, 555A, 550A, 162A, 135A, and 130A)
1010901	Adapter – MiniDIN conductivity probe to 8 pin DIN conductivity meters (150Aplus, 145Aplus, 125Aplus, 115Aplus, and 105Aplus)

Orion Star Stirrer Probe, Cat. No. 096019 and Swing Arm Stand, Cat. No. 090043





Orion Star Stirrer Probe in action – sample mixing without separate stirrer

Thermo Scientific Orion Intrinsically Safe* Meters



Features and Benefits

- For use where non-sparking equipment is desired, these carry US intrinsically safe approval rating by Factory Mutual (FM)*
- Waterproof, portable models for basic field measurements
- 266S and 136S meters include RS232 output, advanced GLPdoc 100 point datalogger with time and date stamp and includes software program for simplified data collection and remote operation on a computer
- Accepts Waterproof DIN, dual banana plug connections
- Units use 3 AA batteries
- 131S and 136S meters offer linear and non-linear temperature compensation for natural and ultrapure water applications
- 3 year meter warranty

*** Does not meet European Intrinsically Safe specification.**

Accessories

Cat. No.	Description
013655	Electrode clip

Product Specifications

		266S/261S	136S/131S
pH	Range	-2.00 to 16.00	–
	Resolution	0.1, 0.01	–
	Relative Accuracy	±0.01	–
	Auto-Buffer Recognition	Dependent on buffer set (7 pre-programmed sets)	–
	Calibration Points	3	–
mV	Range	±1300.0	–
	Resolution	±0.1	–
	Relative Accuracy	±0.1 % of value +0.3 mV	–
Cond	Range	–	0.00 to 500 mS
	Resolution	–	0.01 up to 99.99 µS/cm 0.1 above 99.99 µS/cm
	Relative Accuracy	–	±0.5 % of measured value + 1 count
	Calibration Points	–	1
	Cell Constants	–	0.010 to 199.0 cm^{-1}
Salinity	Range	–	0 to 45.0 (10 to 30 °C) g/kg
	Resolution	–	0.1
TDS	Range	–	0 to 1999 mg/L (10 to 40 °C)
	Resolution	–	1
Temp	Range	-20 to 120 °C	-20 to 120 °C
	Resolution	0.1	0.1
	Relative Accuracy	±0.3 °C	±0.3 °C

Portable Meter and Electrode

Cat. No.	Meter	Sensor (s)
0261S0	261S	9109WP low maintenance pH/ATC Triode™
0266S0	266S	9109WP low maintenance pH/ATC Triode
0131S0	131S	013010A DuraProbe™ conductivity cell
0136S0	136S	013010A DuraProbe conductivity cell

We have more to present in our newly revamped electrodes & accessories sections. Keep going!

Portable Meter, Electrode and Field Kit

Cat. No.	Meter	Sensor (s)	Accessories & Solutions
0261S3	261S	9109WP low maintenance pH/ATC Triode	Neck strap, field case, stand, electrode holder, beakers, 4, 7 and 10 buffers
0266S3	266S	9109WP low maintenance pH/ATC Triode	Neck strap, field case, stand, electrode holder, beakers, 4, 7 and 10 buffers, RS232 cable and software
0131S3	131S	013010A DuraProbe conductivity cell	Beakers, standards
0136S3	136S	013010A DuraProbe conductivity cell	Beakers, standards, RS232 cable and software



pH
ISE
ORP
Cond
DO
Temp



Please visit **www.thermoscientific.com/waterlibrary** for more product information.

Thermo Scientific Orion pH Electrode Features

Select features to meet the needs of your applications

The Thermo Scientific Orion electrode line offers a wide variety of quality pH electrodes to choose from. There are many different factors to consider when you selecting a pH electrode to ensure you select the electrode that will suit your needs. You will need to consider body materials, body styles, and sample requirements. Below is a quick guide to help you choose the correct pH electrode. If you still require assistance, please contact our technical service department at 800-225-1480 or 978-232-6000.

Body Materials

Glass Body	Epoxy Body
	
Compatible with virtually any sample, including solvents	Extremely durable, rugged body prevents breakage
Easy to clean	Electrode bulb protected by bulb guard
Can handle higher temperature	Low-maintenance gel-filled can be used in higher temperatures than glass low-maintenance electrodes

pH Body Style

Standard	Semi-Micro
	
12 mm diameter	6-8 mm diameter
Used in a wide variety of samples	For small samples sizes down to 200 µL

Micro	Rugged Bulb
	
1-5 mm diameter	Glass body
For samples as small as 0.5 µL and containers as small as 384 well plates	Extra durable pH bulb to prevent breakage

Spear Tip	Flat Surface
	
For piercing solid or semi-solid samples	For measuring surfaces of solid or gel samples
Can be used for small volumes	For use with small volumes

Fill Type

Refillable (Glass or Epoxy Body)	Polymer Filled (Sealed Glass or Epoxy Body)	Gel Filled (Sealed Epoxy Body)
Filling solution required	No filling solution needed	No filling solution needed
Easy maintenance, periodic filling and draining needed	Low maintenance, sealed reference	Low maintenance, sealed reference
Longer expected life	Easy to use	Easy to use
For use in a wide variety of applications	For use in a wide variety of applications	General purpose for everyday use
Best precision, 0.01 to 0.02 pH	0.02 pH precision	0.05 to 0.1 pH precision
Most rapid response time	Better response time	Good response time
Longest warranty, 1-2 years (6 months for Ag/AgCl micro electrodes)	1 year warranty	3-6 month warranty (18 months for ROSS 8107 models)

Reference Styles

ROSS Ultra®/ ROSS Reference®	Double Junction Ag/AgCl	Single Junction Ag/AgCl
0.01 pH precision	0.02 pH precision	0.02 to 0.1 pH precision
Best measurement response time	Better measurement response time	Good measurement response time
Best temperature response	Good temperature response	Good temperature response
Ideal for TRIS, protein and sulfide samples	Ideal for TRIS, protein and sulfide samples	General purpose for everyday use
Variety of body styles and types	Variety of body styles and types	Variety of body styles and types
Refillable or gel filled design	Refillable, polymer or gel filled design	Refillable or gel filled design

Junctions – Sure-Flow, Sleeve, Open, Ceramic, Wick and Glass Fiber

Sure-Flow®, Sleeve and Open	Ceramic and Glass Capillary	Wick and Glass Fiber
Best junction for dirty, difficult samples and demanding lab use	Better junction for routine lab use in a variety of samples	Good junction for routine lab use or field use in buffers and aqueous samples
Junction is clog free, easy to clean and has longest use life	Junction is high quality and durable	Good junction with durability
Ideal for thick or viscous samples, compatible with all sample types	Ideal for most lab applications and sample types	Ideal for basic lab applications and aqueous samples





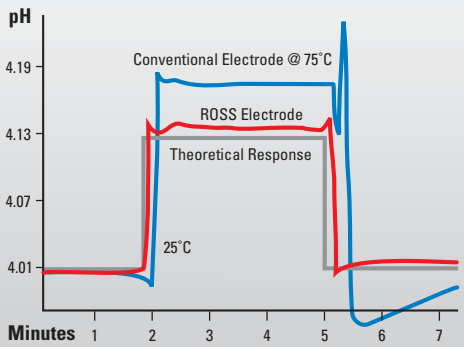
Thermo Scientific Electrode Styles

Thermo Scientific Orion Electrode Families and Types
Thermo Scientific Orion pH electrodes have a variety of different family of electrodes available to help with your measurements needs. They are designed to meet all your measurement needs.

Triodes
Combination pH electrode with built-in temperature sensor. Convenience with being able to measure pH and temperature with one electrode. BNC connector for pH measurement and alternative connector for temperature measurement. Compatible with only Thermo Scientific Orion pH meters as temperature connector and temperature element are unique to meter model.

ROSS Ultra® and ROSS® Electrodes
The best electrode available anywhere! Has the fastest response, best accuracy and reproducibility despite sample composition. Exhibits unmatched response to temperature variations. Double junction reference for complex samples such as biological media, foods, pharmaceuticals, TRIS, sulfides and proteins. Available in all body styles. ROSS Ultra electrodes have an industry best warranty.

The graph shows how ROSS electrodes respond versus the best of conventional pH electrodes. The ROSS electrode continues to show fast reproducibility and accuracy after many dramatic temperature changes.



Temperature Response of the ROSS Ultra® and ROSS® Electrodes vs. Conventional Electrodes

AquaPro Professional pH Electrodes
Low maintenance polymer filled double junction electrode. For use in TRIS, sulfides, proteins and biological media. Has an extended life, fast response and clog resistant open junction. Available in standard, semi-micro, rugged bulb and flat surface body styles. The junction must be kept wet.

Double Junction
Isolated Ag/AgCl reference system which prevents silver from coming in contact with the sample. Great for measuring TRIS buffer, sulfide and protein samples. Available in standard and micro body styles.

No Cal®
Unique reference system that provides quick and accurate measurements. Great for measuring TRIS buffers sulfide and protein samples. No calibration required and accurate to 0.1 pH without calibration. Has the benefit of having a ceramic junction in an epoxy body and also a built-in temperature sensor.

Standard
A large variety of electrodes for a wide range of applications. Includes specialty pH electrodes for unique or challenging pH measurements. Available in most body styles. Micro electrodes capable of measuring samples as small as 0.5 µL in containers as small as 384 well plates.

KnipHe®
The pH electrode is housed in a body with a stainless steel blade for measuring meat, cheese and sludge samples.

Economy or Low-Maintenance
Good performance, valued priced, durable and low maintenance gel-filled pH electrodes. Available in standard, semi-micro and flat surface body styles.

Redox/ORP
The ideal choice for measuring the oxidation reduction potential of samples and performing redox titrations.

ATC Probes
Automatic temperature compensation probes measure sample temperatures and adjust pH measurements by correcting the electrode slope according to the measured temperature.



Thermo Scientific Orion pH Electrode Selection Guide

Sample Type	Electrode Recommendations
pH Precision	
Biological/Pharmaceutical – TRIS buffer, proteins, enzymes	Electrodes should have a ROSS or double junction Ag/AgCl reference (no sample contact with silver)
Education/Student Use	Electrodes should have an epoxy body for added durability
Emulsions – Foods, cosmetics, oils	Electrodes should have a Sure-Flow or open junction to prevent the electrode from clogging
Emulsions – Petroleum products, paint	Electrodes should have a glass body that resists damage from the sample and a Sure-Flow or open junction to prevent the electrode from clogging
Flat Surfaces – Cheese, meat, agar	Electrodes should have a flat-surface tip and ROSS or double junction Ag/AgCl reference (no sample contact with silver)
Flat Surfaces – Paper	Electrodes should have a flat-surface tip
General Purpose – Most sample types	All electrodes are suitable for general purpose measurements
Harsh Environments – Field or plant use, rugged use	Electrodes should have an epoxy body for added durability and be polymer or gel filled for easy maintenance
High Ionic Strength – Acids, bases, brines, pH > 12 or pH < 2	Electrodes should have a Sure-Flow or open junction for better contact with the sample and more stable measurements
Large Sample Sizes – Tall flasks	Electrodes should have a long body that fits the container
Low Ionic Strength – Treated effluent, deionized water, distilled water	Electrodes should be refillable for better contact with the sample and more stable measurements
Non-aqueous – Solvents, alcohols	Electrodes should have a glass body that resists damage from the sample and a Sure-Flow junction for better contact with the sample and more stable measurements
Semi-solids – Fruit, meat, cheese	Electrodes should have a spear tip for piercing samples and a ROSS or double junction Ag/AgCl reference
Small Sample Size – Micro-titer plates	Electrodes should have a small diameter that fits the container
Small Sample Size – NMR tubes	Electrodes should have a small diameter that fits the container
Small Sample Size – Test tubes, small flasks and beakers	Electrodes should have a small diameter that fits the container
Small Sample Size – TRIS buffer, proteins, sulfides	Electrodes should have a small diameter that fits the container and a ROSS or double junction Ag/AgCl reference
Titration	Electrodes should have a Sure-Flow or sleeve junction for better contact with the sample and more stable measurements
Viscous Liquids – Slurries, suspended solids sludges	Electrodes should have a Sure-Flow or open junction to prevent the electrode from clogging
Waters – Acid rain, boiler feed water, distilled water, rain water, well water	Electrodes should have a ROSS or double junction Ag/AgCl reference and be refillable for better contact with the sample
Waters – Drinking water, tap water	Electrodes should have an epoxy body for added durability
Waters – Wastewater, seawater	Electrodes should have a ROSS or double junction Ag/AgCl reference and have an epoxy body for added durability



Electrode Rating — BEST | BETTER | GOOD

ROSS Ultra®	ROSS®	AquaPro	Standard Ag/AgCl	Green	Micro Ag/AgCl	Double Junction	Economy/Basic
0.01	0.01	0.02	0.02	0.02 to 0.05	0.02	0.02	0.05 to 0.1
8102BNUWP 8107BNUMD 8156BNUWP 8157BNUMD	8102BN 8104BN 815600 8165BNWP 8172BNWP	9102AP 9104APWP 9107APMD 9156APWP		GD9106BNWP GD9156BNWP		9102DJWP 9156DJWP	
8107BNUMD 8156BNUWP 8157BNUMD	815600 8165BNWP	9107APMD 9156APWP	9107BNMD 9156BNWP 9157BNMD	GS9106BNWP GD9106BNWP		9156DJWP	9106BNWP
	8165BNWP 8172BNWP	9104APWP 9107APMD	9165BNWP 9172BNWP				
	8172BNWP	9102AP 9104APWP	9172BNWP				
8135BNUWP	8135BN	9135APWP					
8135BNUWP	8135BN	9135APWP					913600
8102BNUWP 8107BNUMD 8156BNUWP 8157BNUMD	8102BN 8104BN 815600 8165BNWP 8172BNWP	9102AP 9104APWP 9107APMD 9156APWP	9102BNWP 9107BNMD 9156BNWP 9157BNMD	GS9106BNWP GD9106BNWP GS9156BNWP GD9156BNWP		9102DJWP 9156DJWP	9106BNWP
8107BNUMD		9107APMD 9156APWP	9107BNMD	GS9106BNWP GD9106BNWP		9156DJWP	9106BNWP
	8165BNWP 8172BNWP	9104APWP 9107APMD 9102AP	9165BNWP 9172BNWP				
							912600
8102BNUWP 8156BNUWP 8157BNUMD	8102BN 815600 8165BNWP 8172BNWP		9165BNWP 9172BNWP	GS9156BNWP GD9156BNWP		9102DJWP	
	8172BNWP		9172BNWP				
	8163BNWP					9120APWP	
	8220BNWP				9810BN		
					9826BN		
8103BNUWP 8115BNUWP	8103BN 8115BN 8175BNWP	9103APWP 9115APWP	9103BNWP		9810BN 9826BN	9110DJWP	911600 912600
8103BNUWP 8115BNUWP	8103BN 8115BN 8175BNWP	9103APWP 9115APWP				9110DJWP	
	8162SC 8165BNWP 8172BNWP						
	8165BNWP 8172BNWP	9104APWP 9107APMD	9165BNWP 9172BNWP				
8102BNUWP 8156BNUWP 8157BNUMD	8102BN 815600 8165BNWP 8172BNWP		9165BNWP 9172BNWP	GS9156BNWP GD9156BNWP		9102DJWP	
8156BNUWP 8157BNUMD	815600 8165BNWP	9107APMD 9156APWP	9156BNWP 9165BNWP	GS9106BNWP GD9106BNWP		9156DJWP	9106BNWP
8156BNUWP 8157BNUMD	815600 8165BNWP	9107APMD 9156APWP	9165BNWP	GD9106BNWP GD9156BNWP		9156DJWP	



Thermo Scientific Orion ROSS pH Electrodes

The Best Choice For Superior Stability, Rapid Response, Accurate and Reproducible pH Measurements

ROSS pH electrodes offer unmatched benefits that you will not find in any other pH electrode. For more than 30 years, ROSS pH electrodes have been providing the best accuracy, stability and response you will find in a pH electrode. Before selecting an electrode, consider the advantages you will have if you choose a ROSS electrode.

Rapid Response and Superior Stability

Compared to conventional electrodes, the proven ROSS reference system exhibits superior stability in measurements, faster response, greater accuracy and precision when measuring samples that vary in temperature or when calibrating in temperatures that differ from your samples.

ROSS electrodes are much more stable over time and avoid the long term drift that other electrodes exhibit. Electrodes drift by less than 0.002 pH per day so recalibration is minimized.

Temperature Response

Most ROSS electrodes have a temperature range of 0 to 100 ºC and show rapid response and stability even when measuring samples that differ by as much as 50 ºC. The readings are much more accurate than standard electrodes in samples with extreme temperature variations. ROSS electrodes provide the correct reading within 30 seconds while standard electrodes are still trying to equilibrate and provide the correct reading after 3 minutes. The graph on page 63 illustrates this response.

No Sample Contamination

Standard silver chloride electrodes leach metal into the fill solution and eventually into the sample. ROSS electrodes do not contain any silver or mercury to react with the sample or to clog the electrode junction which causes sluggish response or inaccurate readings while also reducing electrode life. ROSS pH electrodes can be used in samples such as biological media, foodstuffs and pharmaceuticals where trace amount of metals cannot be tolerated.

Double Junction Design

This design allows you more control over an important variable. In order to minimize errors caused by junction potential, you can use a solution that is similar to the sample. The user also has the ability to change filling solutions to minimize contamination when potassium or chloride in the sample are undesirable.

ROSS electrodes have two main families to choose from. Each family has a variety of electrode options to choose from to ensure you have the correct electrode for your measurement needs. All contain the advantages mentioned previously.

ROSS Ultra®

ROSS Ultra electrodes offer the best stability and drift free measurements of all ROSS electrodes. The reference system is designed to provide an enhanced life. We are so confident of it that the warranty is double that of standard ROSS electrodes. Refillable ROSS Ultra electrodes have a 2 year warranty while the low-maintenance triode™ has an 18 month warranty.

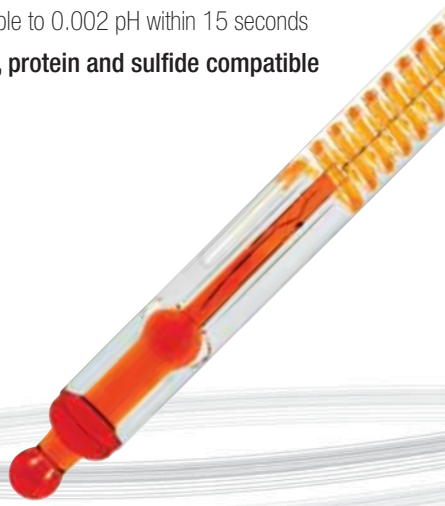
The ROSS Ultra line features glass or epoxy electrodes, refillable or low-maintenance design, flat surface and semi-micro designs. ROSS Ultra Triodes include a built-in temperature sensor and provide faster temperature response that other 3-in-1 electrodes.

ROSS®

Standard ROSS electrodes provide the same rapid response, accuracy and temperature response of all ROSS electrodes. The reference system provides excellent stability. These electrodes provide a one year warranty. They are available in a variety of styles such as the clog free Sure-Flow junction, glass or epoxy electrodes, flat surface, semi-micro, micro and spear tip designs. All standard ROSS electrodes have a refillable design and do not contain a built-in-temperature element.

ROSS Electrode Specifications:

- **Slope:** 92-102 % of theoretical Nernst slope
- **Isopotential Point:** pH 7
- **Accuracy of measuring a pH 6.86 buffer after standardization at 25 ºC:** Accurate within 0.03 pH for buffer at any temperature between 0-100 ºC using automatic temperature compensation
- **Speed of Response in 6.86 buffer going from 25 to 75 ºC:** Response stable to 0.01 pH within 30 seconds
- **Speed of Response between 6.86 and 4.01 buffers at 25 ºC:** Response stable to 0.002 pH within 15 seconds
- **Mercury free, TRIS, protein and sulfide compatible**





Thermo Scientific Orion Sure-Flow pH Electrodes

Clog Free Long Lasting Junction

Sure-Flow® Junction

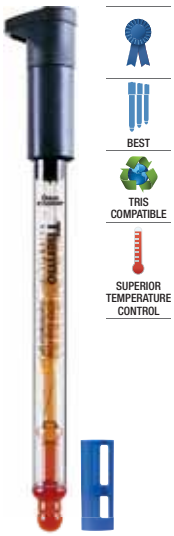
The unique, free-flowing liquid-to-liquid junction assures you of the most stable, drift-free measurements. The easy-to-clean junction never clogs, simply press the cap and flush the junction area. Release the cap and the junction is reset. Now even the most problematic, dirty or viscous samples can be easily measured without a clogged junction! The Sure-Flow junction has proven reliability and extends the electrode life.

ROSS electrodes provide unmatched accuracy and response to extreme temperature changes. They are compatible with samples containing organic compounds, proteins, heavy metals, and other compounds that react with silver such as bromides, iodides, cyanides and sulfides.

Silver chloride sure-flow electrodes can be used on tough samples that do not require a double junction electrode to prevent contact with silver.

ROSS Sure-Flows are also available as semi-micro pH and reference half cell electrodes on pages 75 and 80.

High performance in all samples



ROSS® Sure-Flow® combination pH electrode with glass body

- Sure-Flow junction prevents clogging
- For soil, sludge, colloids, viscous material and organic solvents

Fast response – even in difficult samples



ROSS® Sure-Flow® combination pH electrode with epoxy body

- Ideal for soil samples
- Durable epoxy design
- For TRIS, sulfides and proteins

For all samples including solvents



Sure-Flow® combination pH electrode with glass body

- For soil, sludge, colloids, and viscous material
- Chemical resistant glass body

Fast response in difficult samples & soils



Sure-Flow® combination pH electrode with epoxy body

- Rugged, durable epoxy design
- Has removable bulb guard

Cat. No.	8172BNWP	8165BNWP 8165DN	9172BNWP	9165BNWP
pH Range	0-14	0-14	0-14	0-14
pH Precision	0.01	0.01	0.02	0.02
Temp. Range	0-100 °C	0-100 °C	0-100 °C	0-100 °C
Internal Reference	ROSS	ROSS	Ag/AgCl	Ag/AgCl
Junction	Sure-Flow	Sure-Flow	Sure-Flow	Sure-Flow
Fill Solution (Cat. No.)	3 M KCl (810007)	3 M KCl (810007)	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)
Dimension D (Dia) L (Length) T (Tip)	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm
Connector Type	BNC Waterproof	BNC Waterproof EDIN Waterproof	BNC Waterproof	BNC Waterproof

Cat. No.	Recommended Accessories
810001	ROSS storage solution
810007	ROSS fill solution
900011	Ag/AgCl fill solution
910001	Ag/AgCl storage solution


BNC Waterproof


EDIN Waterproof

Key Information
ROSS electrodes are environmentally-safe mercury-free option for TRIS, protein and sulfide
All cap diameters are 16 mm at bottom of cap
All cable lengths are 1 meter



Thermo Scientific Orion Triode pH Electrodes

Measures pH and Temperature with One Electrode

All Thermo Scientific Orion Triodes™ have built-in temperature sensors allowing you to measure pH and temperature with one electrode. There are a variety of electrodes based on your sample and application.

The ROSS Ultra Triodes offer such great stability and drift that the warranty period is double other electrodes.The refillable electrodes have a two year replacement warranty. The gel-filled ROSS Ultra Triode electrodes have an 18 month warranty.

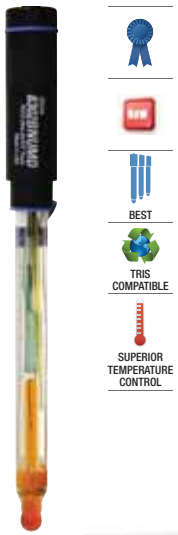
Complex samples, such as biological media, foods and pharmaceuticals, can be measured easily. All ROSS Ultra electrodes can be used in samples that contain TRIS, sulfides or proteins.

ROSS Ultra electrodes offer the best temperature performance of all other electrodes in repeated, varying temperatures.

The AquaPro Triode has the advantage of having an open junction that does not clog and double junction reference. For use in samples with TRIS, protein and sulfides.

Ag/AgCl Triodes have good response and are ideal for routine measurements.

Top performance with glass body



ROSS Ultra® pH/ATC Triode with glass body

- High performance for QC and research
- Chemical resistant glass body

Low maintenance with extended life



ROSS Ultra® pH/ATC Triode with epoxy body, low maintenance gel

- Low maintenance gel
- Rugged epoxy body

Refillable, convenience and durable



ROSS Ultra® pH/ATC Triode with epoxy body

- General purpose, high performance
- Rugged epoxy body

Cat. No.	8302BNUMD (Star)	8107BNUMD (Star)* 8107UWMMD (Star)	8157BNUMD (Star)* 8157UWMMD (Star)
pH Range	0-14	0-14	0-14
pH Precision	0.01	0.01	0.01
Temp. Range	0-100 °C	0-80 °C	0-100 °C
Temp. Accuracy	±1.0 °C	±1.0 °C	±1.0 °C
Internal Reference	ROSS	ROSS	ROSS
Junction	Ceramic	Glass capillary	Glass fiber
Fill Solution (Cat. No.)	3 M KCl (810007)	–	3 M KCl (810007)
Dimension D (Dia) L (Length) T (Tip)	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm
Connector Type	BNC Waterproof - MiniDIN (Star)	BNC Waterproof - MiniDIN (Star)* BNC Waterproof - MiniDIN (Star)* 3 m	BNC Waterproof - MiniDIN (Star)* BNC Waterproof - MiniDIN (Star)* 3 m

Cat. No.	Recommended Accessories
810001	ROSS storage solution
810007	ROSS fill solution
900001	Ag/AgCl fill solution
910001	Ag/AgCl storage solution



Electrode maintains calibration for one year



BEST

TRIS COMPATIBLE

SUPERIOR TEMPERATURE CONTROL

No Cal® combination pH electrode with epoxy body and built-in ATC

- Designed for stable, high performance pH analysis in the field
- Accurate to 0.1 pH without calibration

5107BNMD (Star)
5107NC (A+ Series)

0-14	
0.01	
0-100 °C	
±1.0 °C	
Platinum	
Ceramic	
No Cal (510011)	
L - 120 mm D - 12 mm	
BNC - MiniDIN (Star) BNC - 8 Pin (A+ Series)	

Rugged design with clog free open junction



BETTER

TRIS COMPATIBLE

AquaPro pH/ATC Triode™ with low maintenance polymer, epoxy body

- Low maintenance for Star meters

9107APMD (Star)

0-14	
0.02	
0-60 °C	
±2.0 °C	
Ag/AgCl Double junction	
Open	
–	
L - 120 mm D - 12 mm	
BNC - MiniDIN (Star)	

Low maintenance



BETTER

pH/ATC Triode™ with epoxy body, low maintenance gel

- Low maintenance gel
- Epoxy body for ruggedness

9107BNMD (Star)*
9107WMMD (Star)*
9107WLMD (Star)*
9107BN (A+ Series)
9107WP†

0-14	
0.02	
0-80 °C	
±2.0 °C	
Ag/AgCl	
Wick	
–	
L - 120 mm D - 12 mm	
BNC - MiniDIN (Star) BNC - 8 Pin (A+ Series)†	

Low maintenance



BETTER

pH/ATC Triode™ with epoxy body, low maintenance

- Low maintenance gel
- Epoxy body for ruggedness

9109WP
9109WL

0-14	
0.02	
0-80 °C	
±2.0 °C	
Ag/AgCl	
Wick	
–	
L - 120 mm D - 12 mm Cap D - 22 mm	
EDIN Waterproof Banana Plug	

Refillable and durable



BETTER

pH/ATC Triode™ with epoxy body, refillable

- Long-lasting
- Epoxy body for ruggedness

9157BNMD (Star)
9157BN (A+ Series)

0-14	
0.02	
0-90 °C	
±2.0 °C	
Ag/AgCl	
Glass fiber	
4 M KCl w/ Ag/AgCl (900011)	
L - 120 mm D - 12 mm	
BNC - MiniDIN (Star) BNC - 8 Pin (A+ Series)	

Low maintenance and reliable



GOOD

pH/ATC Triode™ with epoxy body, low maintenance gel

- General purpose
- For Russell RL060P meter

9147BN

0-14	
0.1	
0-50 °C	
±2.0 °C	
Ag/AgCl	
HDPE pin	
–	
L - 120 mm D - 12 mm	
BNC 2.5 mm Phono Tip	



Key Information

Cable lengths range from 1 to 6 meters
WMMD = 3 meters, WLMD = 6 meters, 9109WL = 6 meters

9109 cap is for intrinsically safe meters



Thermo Scientific Orion Glass Refillable pH Electrodes

Chemical Resistant Glass Bodies

Glass body electrodes offer superior chemical resistance. They are also able to withstand higher temperatures than epoxy electrodes, with some models able to be used up to 100 °C. Glass electrodes are also easy to clean as they are compatible with most solvents and inorganic materials.

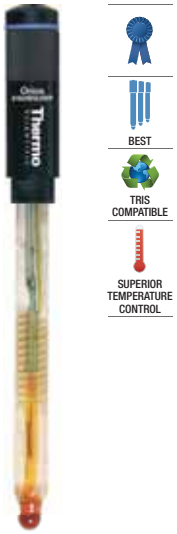
ROSS Ultra and ROSS electrodes provide unmatched ROSS accuracy and rapid response to temperature extremes. All are TRIS compatible. ROSS Ultra glass electrodes have an industry best 2 years warranty.

AquaPro refillable electrodes are TRIS compatible and have a open junction that does not clog.

Double junction electrodes are recommended for samples containing organic compounds, proteins, heavy metals and other compounds that interact with silver.

Single junction electrodes provide a reliable option for routine pH measurement.

Top performance for QC and research



ROSS Ultra® combination pH electrode with extended life

- For precise pH determinations
- General purpose, high performance

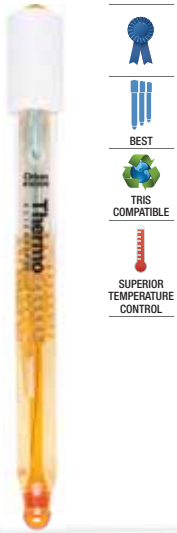
Precise yet durable, for QC and research



ROSS Ultra® combination pH electrode with rugged bulb, extended life

- Toughened bulb for rugged lab use

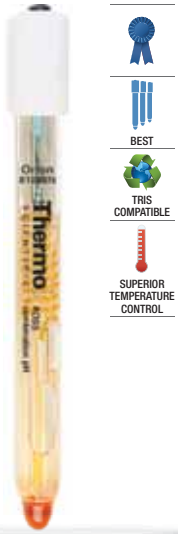
For precise and reproducible pH determinations



ROSS® combination pH electrode

- General purpose, high performance
- For QC and research applications

Durable, for precise pH analysis



ROSS® combination pH electrode with glass body, rugged bulb

- Toughened bulb for rugged lab use
- For QC and research applications

Cat. No.	8102BNUWP	8104BNUWP	8102BN 8102SC	8104BN 8104SC
pH Range	0-14	0-14	0-14	0-14
pH Precision	0.01	0.01	0.01	0.01
Temp. Range	0-100 °C	0-100 °C	0-100 °C	0-100 °C
Internal Reference	ROSS	ROSS	ROSS	ROSS
Junction	Ceramic	Ceramic	Ceramic	Ceramic
Fill Solution (Cat. No.)	3 M KCl (810007)	3 M KCl (810007)	3 M KCl (810007)	3 M KCl (810007)
Dimension D (Dia) L (Length) T (Tip)	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm
Connector Type	BNC Waterproof	BNC Waterproof	BNC Screw Cap	BNC Screw Cap

Cat. No.	Recommended Accessories
910001	Ag/AgCl storage solution
900011	Ag/AgCl fill solution
910008-WA	3 M KCl double junction fill solution

Cat. No.	Recommended Accessories
810001	ROSS storage solution
810007	ROSS fill solution



For accurate pH analysis and titrations



ROSS® combination pH electrode with 14/15 standard taper

- For titrators or vessels that require a standard taper joint

8162SC

0-14	
0.01	
0-100 °C	
ROSS	
Sleeve	
3 M KCl (810007)	
L - 120 mm D - 12 mm	
Screw Cap	

Accurate and reliable



Double Junction combination pH electrode

- General purpose
- Easy-to-clean design

9102DJWP

0-14	
0.02	
0-60 °C	
Ag/AgCl Double junction	
Ceramic	
3 M KCl (910008-WA)	
L - 120 mm D - 12 mm	
BNC Waterproof	

General purpose for everyday use



Combination pH electrode

- For routine or research applications

9102BNWP 9102SC

0-14	
0.02	
0-90 °C	
Ag/AgCl	
Ceramic	
4 M KCl w/ Ag/AgCl (900011)	
L - 120 mm D - 12 mm	
BNC Waterproof Screw Cap	

Durable and reliable



Combination pH electrode with rugged bulb

- Toughened bulb for rugged lab use

9104BNWP 9104SC

0-14	
0.02	
0-90 °C	
Ag/AgCl	
Ceramic	
4 M KCl w/ Ag/AgCl (900011)	
L - 120 mm D - 12 mm	
BNC Waterproof Screw Cap	

General purpose and reliable



Combination pH electrode

- General purpose
- Easy-to-clean design

9142BN

0-14	
0.1	
0-90 °C	
Ag/AgCl	
Ceramic	
4 M KCl w/ Ag/AgCl (900011)	
L - 120 mm D - 12 mm	
BNC	


BNC Waterproof


BNC


Screw Cap

Key Information

All cap diameters are 16 mm

All cable lengths are 1 meter



Thermo Scientific Orion Epoxy Refillable pH Electrodes

Rugged Epoxy Body Prevents Breakage

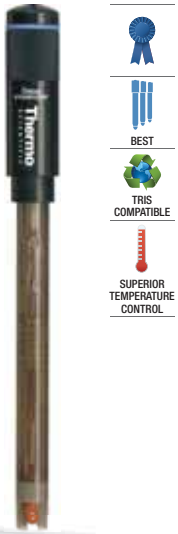
Epoxy body electrodes are ideal for field measurements or situations where they will be exposed to rugged handling. The electrode body surrounds the glass pH bulb providing further protection.

ROSS Ultra and ROSS electrodes exhibit unmatched accuracy and rapid response to extreme temperature variations. All are TRIS compatible. The ROSS Ultra electrode has an unprecedented 2 year warranty.

Green electrodes are the first lab electrode to contain no lead, mercury or other hazardous substances and are completely ROHS compliant. They are available in single or double junctions designs.

Silver chloride epoxy electrodes provide excellent response and performance in routine samples.

Top performance – precise pH analysis with durability



ROSS Ultra® combination pH electrode with epoxy body

- Top accuracy and rapid response to temperature extremes
- General purpose, high performance
- Extended life

Durable for precise pH applications



ROSS® combination pH electrode with epoxy body

- Top accuracy and rapid response to temperature extremes
- General purpose, high performance

Refillable, double junction



Green combination double junction refillable pH electrode with epoxy body

- Ideal for routine or research applications
- Use in dirty water or TRIS, sulfide and protein samples
- Contains no lead

Refillable, rugged epoxy body



Green combination refillable pH electrode with epoxy body

- Ideal for routine or research applications
- Contains no lead

General purpose and reliable



Combination pH electrode with epoxy body

- For routine or research applications
- Reliable and durable

Cat. No.	8156BNUWP	815600 8155SC	GD9156BNWP	GS9156BNWP	9156BNWP 9156SC
pH Range	0-14	0-14	0-14	0-14	0-14
pH Precision	0.01	0.01	0.02	0.02	0.02
Temp. Range	0-100 °C	0-100 °C	0-90 °C	0-90 °C	0-90 °C
Temp. Accuracy	–	–	–	–	–
Internal Reference	ROSS	ROSS	Ag/AgCl Double junction	Ag/AgCl	Ag/AgCl
Junction	Glass fiber	Glass fiber	Glass fiber	Glass fiber	Glass fiber
Fill Solution (Cat. No.)	3 M KCl (810007)	3 M KCl (810007)	3 M KCl (910008-WA)	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)
Dimension D (Dia) L (Length) T (Tip)	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm
Connector Type	BNC Waterproof	BNC Screw Cap	BNC Waterproof	BNC Waterproof	BNC Waterproof Screw Cap

Cat. No.	Recommended Accessories
900011	Ag/AgCl fill solution
810007	ROSS fill solution
910008-WA	3M KCl double junction fill solution


Screw Cap


BNC Waterproof


BNC



Thermo Scientific Orion Micro pH Electrodes

Delicate Electrode for Small Volumes, Fits 384 Microwell Plates

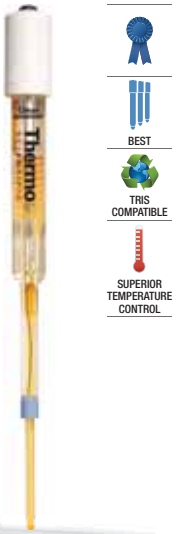
Micro electrodes are designed to measure small volumes down to 0.5 µL. These are extremely delicate electrodes because of their size and should be treated as such. The small stem and bulb diameter allow the electrode to be inserted into small devices such as 384 microwell plates. There are are a variety to choose from based on your measurement needs.

The ROSS 8220BNWP micro electrode provides the best accuracy and response time of the micro electrodes. It can be used in biological samples. The 8220BNWP is more durable than the silver chloride electrodes.

Silver chloride micro electrodes are single junction electrodes. They are avaiable to measure samples as small as 0.5 µL, for use in NMR tubes and available with a stainless steel needle tip over the glass stem and bulb.

The double junction micro electrode is for moderate size samples. The double junction design is good for use when measuring TRIS samples, proteins, sulfides or biologicals.

Accurate in extremely small samples



BEST
TRIS COMPATIBLE
SUPERIOR TEMPERATURE CONTROL

PerpHecT® ROSS® combination pH electrode with glass body, micro

- Measures samples as small as 15 µL in 384 well plates
- Minimum depth of immersion is 4.5 mm
- Durable tip design

Measure samples as small as 0.5 µL



BETTER

Micro combination pH electrode with glass body, small tip

- Designed for gels and small sample volumes
- Measure samples as small as 0.5 µL

For use in NMR tubes



BETTER

Micro combination pH electrode with glass body, long length

- Ideal for measurements in extremely small vessels

For piercing septa



BETTER

Micro combination pH electrode with needle tip

- 16 gauge stainless steel bevel tip

For samples with size limitations



BETTER
TRIS COMPATIBLE

Double Junction combination pH electrode with glass body, semi-micro tip

- Measure samples as small as 0.2 mL
- Easy-to-clean refillable design

Cat. No.	8220BNWP	9810BN	9826BN	9863BN	9110DJWP
pH Range	0-14	0-14	0-14	0-14	0-14
pH Precision	0.01	0.02	0.02	0.02	0.02
Temp. Range	0-100 °C	0-80 °C	0-80 °C	0-80 °C	0-60 °C
Temp. Accuracy	±0.5 °C	–	–	–	–
Internal Reference	ROSS	Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl Double junction
Junction	Sleeve	Ceramic	Ceramic	Ceramic	Ceramic
Fill Solution (Cat. No.)	3 M KCl (810007)	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)	3 M KCl (910008-WA)
Dimension D (Dia) L (Length) T (Tip)	L - 155 mm T - 3 mm x 40 mm L	L - 120 mm T - 1.3 mm x 37 mm L	L - 228 mm T - 2.5 mm x 2.5 mm L	L - 137 mm T - 1.7 mm x 40 mm L	L - 150 mm T - 4.5 mm x 90 mm L
Depth of Immersion	4.5 mm	1 mm	2 mm	3 mm	–
Connector Type	BNC Waterproof	BNC	BNC	BNC	BNC Waterproof



BNC Waterproof



BNC

Key Information

All cap diameters are 16 mm at bottom of cap except 9810BN, 9826BN & 9863BN

All cable lengths are 1 meter



Thermo Scientific Orion Glass Semi Micro pH Electrodes

Measures Samples As Small As 0.2 mL. Fits Test Tubes and Small Containers

Glass body semi-micro pH electrodes provide superior chemical resistance and can withstand high temperatures extremes. There are a variety of options to choose from.

ROSS Ultra and ROSS semi-micro pH electrodes provide optimum accuracy and unmatched response in samples of varying temperatures. They are available in chemical resistant glass bodies. All ROSS electrodes are TRIS compatible.

AquaPro semi-micro electrodes have a clog free open junction and are TRIS compatible.

Silver chloride semi-micro electrodes are durable and provide reliable and accurate measurements of routine samples.

Ideal for QC samples with size limitations



ROSS Ultra® combination pH electrode with glass body, semi-micro tip

- Extended life
- TRIS compatible
- Fast response at temperature extremes

Fast, reliable results in small samples



ROSS® combination pH electrode with glass body, semi-micro tip

- TRIS compatible
- Fast response at temperature extremes

Fast response in small samples



AquaPro combination pH electrode with low maintenance polymer, glass body, semi-micro tip

- TRIS compatible
- Open junction prevents clogging

For samples with size constraints



Combination pH electrode with glass body, semi-micro tip

- For routine or research applications

Cat. No.	8103BNUWP	8103BN 8103SC	9103APWP	9103BNWP 9103SC
pH Range	0-14	0-14	0-14	0-14
pH Precision	0.01	0.01	0.02	0.02
Temp. Range	0-100 °C	0-100 °C	0-60 °C	0-90 °C
Internal Reference	ROSS	ROSS	Ag/AgCl Double junction	Ag/AgCl
Junction	Ceramic	Ceramic	Open	Ceramic
Fill Solution (Cat. No.)	3 M KCl (810007)	3 M KCl (810007)	–	4 M KCl w/ Ag/AgCl (900011)
Dimension D (Dia) L (Length) T (Tip)	L - 165 mm T - 6 mm x 95 mm L	L - 165 mm D - 6 mm x 95 mm L	L - 165 mm T - 6.5 mm x 100 mm L	L - 165 mm T - 6.5 mm x 100 mm L
Connector Type	BNC Waterproof	BNC Screw Cap	BNC Waterproof	BNC Waterproof Screw Cap

Cat. No.	Recommended Accessories
910001	Electrode storage solution
900011	Ag/AgCl fill solution
810001	ROSS storage solution
810007	ROSS fill solution


Screw Cap


BNC Waterproof


BNC

Key Information
All cap diameters are 16 mm
All cable lengths are 1 meter



Thermo Scientific Orion Epoxy Semi Micro pH Electrodes

Rugged Body for Small Samples or Narrow Containers

Epoxy body semi-micro pH electrodes provide a rugged design. They are available in double junction or single junction designs as well as refillable or low-maintenance options.

ROSS electrodes offer optimum accuracy and temperature response. AquaPro electrodes provide maintenance-free use. Silver chloride electrodes are for routine measurements.

For difficult samples with size limitations



ROSS® Sure-Flow® combination pH electrode with epoxy body, semi-micro tip

- Sure-Flow junction prevents clogging
- Measure samples as small as 0.2 mL

For aqueous samples with size constraints



ROSS Ultra® combination pH electrode with epoxy body, semi-micro tip

- Measures samples as small as 0.2 mL
- Epoxy body for ruggedness and durability

Dependable results in small samples



ROSS® combination pH electrode with epoxy body, semi-micro tip

- Epoxy body for ruggedness and durability
- Measures samples as small as 0.2 mL

Fast response in small samples



AquaPro combination pH electrode with low maintenance polymer, epoxy body, semi-micro tip

- TRIS compatible
- Open junction prevents clogging

For everyday use in small samples



Combination pH electrode with epoxy body, low maintenance gel, semi-micro tip

- Measure samples as small as 0.2 mL

For everyday use in tall containers



Combination pH electrode with epoxy body, low maintenance gel, flask length

- Designed for use in long-necked flasks

Cat. No.	8175BNWP	8115BNUWP	8115BN 8115SC	9115APWP	911600	912600
pH Range	0-14	0-14	0-14	0-14	0-12	0-12
pH Precision	0.01	0.01	0.01	0.02	0.1	0.1
Temp. Range	0-100 °C	0-100 °C	0-100 °C	0-60 °C	0-80 °C	0-80 °C
Internal Reference	ROSS	ROSS	ROSS	Ag/AgCl Double junction	Ag/AgCl	Ag/AgCl
Junction	Sure-Flow	Glass fiber	Glass fiber	Open	Wick	Wick
Fill Solution (Cat. No.)	3 M KCl (810007)	3 M KCl (810007)	3 M KCl (810007)	–	–	–
Dimension D (Dia) L (Length) T (Tip)	L - 165 mm T - 8 mm x 95 mm L	L - 165 mm T - 8 mm x 95 mm L	L - 165 mm T - 8 mm x 95 mm L	L - 160 mm T - 8 mm x 90 mm L	L - 145 mm D - 6 mm	L - 305 mm D - 8 mm
Connector Type	BNC Waterproof	BNC Waterproof	BNC Screw Cap	BNC Waterproof	BNC	BNC


Screw Cap


BNC Waterproof


BNC

Key Information

All cap diameters are 16 mm except 911600

All cable lengths are 1 meter



Thermo Scientific Orion Low Maintenance pH Electrodes

Never Requires Fill Solution

Low maintenance pH electrodes are easy to use and require minimal maintenance. Since the reference chamber is sealed, you never need to replace fill solution or clean and rinse the reference chamber. You may choose from many styles such as AquaPro, Green electrodes, double junction or silver chloride electrodes to suit your measurement needs.

AquaPro low maintenance pH electrodes offer open junctions that do not clog. Choose between chemical resistant glass bodies or durable epoxy bodies. All AquaPro electrodes are TRIS compatible.

Green electrodes contain no hazardous substances such as mercury or lead and are ROHS compliant.

Double junction electrodes are TRIS compatible and you do not have to worry about interfering substances.

Silver chloride electrodes offer low maintenance as well as reliable measurements for everyday use.

Reliable and accurate



BETTER

TRIS COMPATIBLE

AquaPro combination pH electrode with low maintenance polymer, glass body

- General purpose, high performance

Precise and durable



BETTER

TRIS COMPATIBLE

AquaPro combination pH electrode with low maintenance polymer, glass body, rugged bulb

- Toughened bulb for rugged lab use

Rugged and accurate



BETTER

TRIS COMPATIBLE

AquaPro combination pH electrode with low maintenance polymer, epoxy body

- General purpose, high performance

Low maintenance, double junction



BETTER

TRIS COMPATIBLE

LEAD FREE

Green combination double junction pH electrode, gel with epoxy body

- Ideal for education, plant or field use
- Use in dirty water or TRIS, sulfide and protein samples
- Contains no lead

Cat. No.	9102AP	9104APWP	9156APWP	GD9106BNWP
pH Range	0-14	0-14	0-14	0-14
pH Precision	0.02	0.02	0.02	0.02
Temp. Range	0-60 °C	0-60 °C	0-60 °C	0-90 °C
Internal Reference	Ag/AgCl Double junction	Ag/AgCl Double junction	Ag/AgCl Double junction	Ag/AgCl Double junction
Junction	Open	Open	Open	Glass capillary
Dimension D (Dia) L (Length) T (Tip)	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm
Connector Type	BNC	BNC Waterproof	BNC Waterproof	BNC Waterproof

Cat. No.	Recommended Accessories
910001	Electrode storage solution
910199	All-in-one pH buffer kit



Low maintenance, rugged epoxy body



BETTER

LEAD FREE

Green combination pH electrode, gel with epoxy body

- Ideal for education, plant or field use
- Contains no lead

Durable and low maintenance



BETTER

TRIS COMPATIBLE

Double Junction combination pH electrode with epoxy body, low maintenance gel

- Low maintenance gel with durable epoxy body

For rugged, everyday use



GOOD

Combination pH electrode with epoxy body, low maintenance gel

- Ideal for field, plant, or educational applications

Reliable every day use



GOOD

Combination pH electrode with epoxy body, low maintenance gel

- General purpose use
- Removable bulb guard makes cleaning easy

GS9106BNWP	9156DJWP	9106BNWP	9146BN
0-14	0-14	0-14	0-14
0.05	0.02	0.05	0.1
0-90 °C	0-60 °C	0-80 °C	0-80 °C
Ag/AgCl	Ag/AgCl Double junction	Ag/AgCl	Ag/AgCl
Glass capillary	Wick	Wick	Wick
L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm
BNC Waterproof	BNC Waterproof	BNC Waterproof	BNC



BNC Waterproof



BNC

Key Information
All cap diameters are 16 mm
All cable lengths are 1 meter



Thermo Scientific Orion Flat Surface pH Electrodes

Measure Moist Surfaces Such As Agar Gel Plates, Meats and Cheese

Flat surface electrodes are epoxy body electrodes with a flat pH bulb that allow you to measure moist solid samples or small volumes. They can be uses on samples such as meats, cheese or in agar gel plates. Flat surface pH electrodes are available in single or double junction designs allowing you to measure samples such as TRIS buffers or samples containing protein, sulfides or other compounds that react with silver. You may also choose from refillable or low maintenance designs.

Thermo Scientific Orion ROSS Ultra and ROSS flat surface electrodes provide optimum accuracy and stability while being TRIS compatible. The ROSS Ultra flat surface electrode has a 2 year warranty.

The AquaPro flat surface electrode is TRIS compatible and has an open junction that does not clog. The 9135APWP AquaPro flat surface electrode is a low maintenance model never requiring fill solution.

The silver chloride 913600 flat surface electrode is a low maintenance electrode that is ideal for routine measurements.

Ideal for soft solid and semi-solid samples



BEST
TRIS COMPATIBLE
SUPERIOR TEMPERATURE CONTROL

ROSS Ultra® combination pH electrode with epoxy body, flat surface

- Extended life and 2 year warranty
- Rapid response to temperature extremes

For soft solid and semi-solid samples



BEST
TRIS COMPATIBLE
SUPERIOR TEMPERATURE CONTROL

ROSS® combination pH electrode with epoxy body, flat surface

- Premium performance
- Rapid response to temperature extremes

For soft solids and semi-solids



BETTER
TRIS COMPATIBLE

AquaPro combination pH electrode with low maintenance polymer, epoxy body, flat surface

- Clog free junction for tough samples

For solids and semi-solids



GOOD

Combination pH electrode with epoxy body, low maintenance gel, flat surface

- For routine flat surface measurements

Cat. No.	8135BNUWP	8135BN 8135SC	9135APWP	913600
pH Range	0-14	0-14	0-14	0-12
pH Precision	0.01	0.01	0.02	0.1
Temp. Range	0-100 °C	0-100 °C	0-60 °C	0-80 °C
Internal Reference	ROSS	ROSS	Ag/AgCl Double junction	Ag/AgCl
Junction	Glass fiber	Glass fiber	Open	Wick
Fill Solution (Cat. No.)	3 M KCl (810007)	3 M KCl (810007)	–	–
Dimension D (Dia) L (Length) T (Tip)	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 110 mm D - 12 mm
Connector Type	BNC Waterproof	BNC Screw Cap	BNC Waterproof	BNC

Cat. No.	Recommended Accessories
910001	Electrode storage solution
900011	Ag/AgCl fill solution
810007	ROSS fill solution
910008-WA	3 M KCl fill solution



Screw Cap



BNC Waterproof



BNC

Key Information

All cable lengths are 1 meter



Thermo Scientific Orion Spear Tip pH Electrodes

For Piercing Fruits, Cheese and Meats

Spear tip pH electrodes can be used for piercing soft samples like cheese or fruit or cutting through tougher samples such as meat. All have refillable designs. They are available in single junction or double junction deigns which can be used with TRIS samples, proteins or sulfides.

The ROSS spear tip electrode offers the proven accuracy and response that ROSS electrodes are know for and is a double junction electrode. It is suited for semi-solid samples

The 9163SC is suited for routine measurements and is for use in semi-solid samples.

The KnipHe electrode has a glass electrode that is encased in a stainless steel housing with a cutting blade at the tip. It is used for tough samples such as meat. It has a double junction design.

The 9162BNWP can be used for soft samples or routine clean water measurements. It has a single junction design.

For piercing semi-solid samples



BEST

TRIS COMPATIBLE

SUPERIOR TEMPERATURE CONTROL

ROSS® combination pH electrode with glass body, spear tip

- For cheese, meat, and fruit samples
- Measure samples as small as 100 µL
- Double junction for TRIS samples

For piercing soft samples



BETTER

Combination pH electrode, glass body, spear tip

- For cheese, meat, and fruit samples
- Measure samples as small as 100 µL

For meat, cheese and sludge samples



BETTER

TRIS COMPATIBLE

KNIpHE® Double Junction combination pH electrode with stainless steel cutting blade

- For meat, cheese and sludge where glass alone may break
- Replacement electrode Cat. No. 9121APWP
- Replacement blade Cat. No. 712001
- Replacement sheath Cat. No. 712002

Rugged with an easy-to-clean bulb



BETTER

Low resistance combination pH electrode with glass body, rugged bulb

- For routine or clean water measurements
- For soft samples

Cat. No.	8163BNWP 8163SC	9163SC	9120APWP	9162BNWP
pH Range	0-14	0-14	0-14	0-14
pH Precision	0.01	0.02	0.02	0.02
Temp. Range	0-100 °C	0-90 °C	0-60 °C	0-90 °C
Internal Reference	ROSS	Ag/AgCl	Ag/AgCl Double junction	Ag/AgCl
Junction	Ceramic	Ceramic	Ceramic	Ceramic
Fill Solution (Cat. No.)	3 M KCl (810007)	4 M KCl w/ Ag/AgCl (900011)	3 M KCl (910008-WA)	4 M KCl w/ Ag/AgCl (900011)
Dimension D (Dia) L (Length) T (Tip)	L - 110 mm T - 4.5 mm x 20 mm L	L - 95 mm D - 6.5 mm x 25 mm L	L - 215 mm D - 16 mm	L - 120 mm D - 12 mm
Connector Type	BNC Waterproof Screw Cap	Screw Cap	BNC Waterproof	BNC Waterproof

Cat. No.	Recommended Accessories
900011	Ag/AgCl fill solution
810007	ROSS fill solution
910008	3M KCl fill solution



Screw Cap



BNC Waterproof

Key Information
All cap diameters are 16 mm
All cable lengths are 1 meter



Thermo Scientific Orion pH Half Cell and Reference Half Cell Electrodes

pH half cells require the use of a reference half cell electrode.

Reference half cells are for use with either a pH half cell sensing electrode or an ISE half cell reference electrode. They are available as single or double reference designs. Clog free Sure-flow junctions are also available extending the life of your electrode.

Ross half cells should be paired together. 900100 and 900200 are silver chloride references for pH and ISE electrodes.

Accurate, ROSS rapid response in a half-cell design



ROSS® pH half-cell with glass body

- Use with 800300 ROSS Sure-Flow or 800500U ROSS Ultra reference electrodes

Accurate results in a half-cell



pH half-cell with glass body

- Use with 900100 single junction or 900200 double junctions reference electrodes

Top performance and long life



ROSS Ultra® reference half-cell with glass body

- Use with 8101BNWP or 8101SC ROSS pH half-cell or 8411BN ROSS sodium half-cell electrodes

For all samples including solvents



ROSS® Sure-Flow® reference half-cell with glass body

- Sure-Flow junction prevents clogging
- Use with 8101BNWP or 8101SC ROSS pH half-cell or 8411BN ROSS sodium half-cell electrodes

For use with ISE half-cell or pH electrodes



Double Junction Sure-Flow® reference half-cell with epoxy body

- Sure-Flow junction prevents clogging
- Double junction allows a variety of filling solutions to be used

For routine pH and many ISE measurements



Single Junction Sure-Flow® reference half-cell with epoxy body

- Use with 9101BN and 9101SC pH half-cell electrodes
- Compatible with several ISEs

Cat. No.	8101BNWP 8101SC	9101BN 9101SC	800500U	800300	900200	900100
pH Range	0-14	0-14	0-14	0-14	0-14	0-14
pH Precision	0.01	0.02	–	–	–	–
Temp. Range	0-100 °C	0-90 °C	0-100 °C	0-100 °C	0-100 °C	0-100 °C
Internal Reference	ROSS	Ag/AgCl	ROSS	ROSS	Ag/AgCl Double junction	Ag/AgCl
Junction	–	–	Ceramic	Sure-Flow	Sure-Flow	Sure-Flow
Fill Solution (Cat. No.)	–	–	3 M KCl (810007)	3 M KCl (810007)	Equitransferent solution (900002) outer (900003)	Equitransferent solution w/ Ag/AgCl (900001)
Dimension D (Dia) L (Length) T (Tip)	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 110 mm D - 13 mm	L - 110 mm D - 13 mm
Connector Type	BNC Waterproof Screw Cap	BNC Screw Cap	Pin Tip	Pin Tip	Pin Tip	Pin Tip

Cat. No.	Recommended Accessories
810007	ROSS fill solution
900001	Single junction reference fill solution
900002	Double junction reference inner fill solution
900003	Double junction reference outer fill solution


Screw Cap


BNC Waterproof


BNC


Pin Tip

Key Information
All cap diameters are 16 mm at bottom of cap
All cable lengths are 1 meter



Thermo Scientific Orion ATC Probes

Accurate Temperature Measurement

ATC probes will measure the temperature of your sample quickly and accurately. They are extremely durable. There are a variety of options available to you to use depending on your application. Choose from a micro ATC probe, stainless steel, glass or epoxy body probe. The connector must be compatible with the meter you are using.

Fastest temperature response



BEST

Micro ATC probe with stainless steel tip and epoxy body

- For critical temperature monitoring
- Measures samples as small as 10 µL
- Minimum depth of immersion is 3 mm

Rugged stainless steel



BEST

ATC probe with stainless steel body

- Extremely durable body
- For field, plant, and food applications

Solvent-resistant glass



BETTER

ATC probe with glass body

- For solutions that contain organic solvents

Durable epoxy



BETTER

ATC probe with epoxy body

- General purpose
- For aqueous samples, intermittent use in methanol or ethanol

Small diameter rugged stainless steel



GOOD

ATC probe with stainless steel body

- Extremely durable body
- For field, plant, and food applications
- For use with Russell meters

Cat. No.	928007MD (Star)	927007MD (Star) 917007 (A+ Series) 927007 (PerpHecT)	927006MD (Star) 917006 (A+ Series) 927006 (PerpHecT)	927005MD (Star) 917005 (A+ Series) 927005 (PerpHecT) 917001 (Older Orion Meters)	917004
Temp. Range	0-100 °C	0-100 °C	0-100 °C	0-80 °C	0-100 °C
Temp. Accuracy	±1 °C	±2 °C	±2 °C	±2 °C	±2 °C
Dimension D (Dia) L (Length) T (Tip)	L - 117 mm D - 5 mm D - 1 mm x 38 mm L	L - 120 mm D - 6 mm	L - 120 mm D - 8 mm	L - 120 mm D - 6 mm	L - 120 mm D - 3 mm
Connector Type	MiniDIN for Star	MiniDIN (Star) 8 Pin DIN (A+ Series)† Phono Tip (PerpHecT)	MiniDIN (Star) 8 Pin DIN (A+ Series)† Phono Tip (PerpHecT)	MiniDIN (Star) 8 Pin DIN (A+ Series)† Phono Tip (PerpHecT) Dual Banana Plug (Older Orion Meters)	2.5 mm Phono Jack for Russell meters



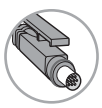
2.5 mm Phono Tip



Dual Banana Plug



Phono Tip (PerpHecT)



MiniDIN (Star)



8 Pin DIN (A Series)

Key Information

All cap diameters are 16 mm except 928007MD

All cable lengths are 1 meter



Thermo Scientific Orion Redox/ORP and ORP Triode Electrodes

Reliable Redox Measurements

ORP measurements are easily made with your choice or ORP electrodes. Use our reliable ORP standard and compare your results to the Standard Hydrogen Electrode.

The 9678BNWP is an durable epoxy body electrode with a non-clog Sure-Flow junction. The 9778BNWP offers a chemical resistant glass body. ORP triodes have a durable epoxy body and can measure temperature also. They are available in refillable design or low-miantenance gel filled styles.

Durable and clog-free



Sure-Flow® combination redox/ ORP electrode with epoxy body

- For use in water, wastewater, metal plating, and biotech samples
- Sure-Flow junction prevents clogging

Solvent-resistant glass body



Combination redox/ ORP electrode with glass body

- For use in water, wastewater, metal plating and organic solvent samples

Easy-to-clean with built-in ATC



ORP/ATC Triode™ with epoxy body, refillable

- For use in water and wastewater
- Epoxy body for ruggedness and durability

Low maintenance with built-in ATC



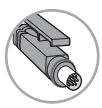
ORP/ATC Triode™ with epoxy body, low maintenance gel

- For use in water and wastewater
- Epoxy body for ruggedness and durability

Cat. No.	9678BNWP	9778BNWP	9180BNMD (Star) 9180BN (A+ Series)	9179BNMD (Star) 9179BN (A+ Series)
pH Range	–	–	–	–
Temp. Range	0-90 °C	0-100 °C	0-90 °C	0-80 °C
Temp. Accuracy	–	–	±2.0 °C	±2.0 °C
Internal Reference	Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl
Junction	Sure-Flow	Ceramic	Glass Fiber	Wick
Fill Solution (Cat. No.)	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)	–
Dimension D (Dia) L (Length) T (Tip)	L - 110 mm D - 13 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm
Connector Type	BNC Waterproof	BNC Waterproof	BNC Waterproof - MiniDIN (Star) BNC Waterproof - 8 Pin (A+ Series)	BNC Waterproof - MiniDIN (Star) BNC Waterproof - 8 Pin (A+ Series)

Cat. No.	Recommended Accessories
900011	Ag/AgCl fill solution
967901	ORP standard 475 mL
967961	ORP standard 5 x 60 mL


BNC Waterproof


MiniDIN (Star)


8 Pin DIN (A Series)

Key Information
All cap diameters are 16 mm at bottom of cap
All cable lengths are 1 meter



Thermo Scientific Orion Silver Billet and Karl Fischer Electrodes

Electrodes for Titrations and Speciality Applications

The 977900 is a double platinum chemical resistant glass electrode for use with Karl Fischer titrations. It has a ground glass joint on the body to fit into titration vessels.

The 9780SC is a glass silver billit electrode used in halide titrations.

Thermo Scientific Orion Storage Sleeve and Base

If you ever have had an electrode drop on a lab bench and break you will want to use the storage sleeve and base, 810017.

Features and Benefits

- Protects electrode from breakage when not in use
- Covers entire glass body of standard size pH electrodes (12 x 120 mm)
- pH bulb stays conditioned when not in use
- Weighted base prevents electrode from tipping
- Sleeve can be removed from base to store in electrode holder



Storage Sleeve and Base 810017

For Karl Fischer titrations



BEST

Karl Fischer double platinum electrode with glass body

- For accurate Karl Fischer titrations

For halide titrations



BETTER

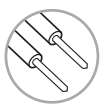
Silver Billet combination electrode

- For accurate and reliable halide titrations

Cat. No.	977900	9780SC
pH Range	Endpoint Indicator	Endpoint Indicator
Temp. Range	0-40 °C	0-80 °C
Internal Reference	Platinum	Ag/AgCl
Junction	–	Ceramic
Fill Solution (Cat. No.)	–	4 M KCl w/ Ag/AgCl (900011)
Dimension D (Dia) L (Length) T (Tip)	L - 120 mm D - 12 mm	L - 150 mm D - 12 mm
Connector Type	Dual Pin Tip	Screw Cap



Screw Cap



Dual Pin Tip

Key Information
Environmentally-safe mercury-free
All cap diameters are 16 mm at bottom of cap
All cable lengths are 1 meter

Thermo Scientific Orion Star Stirrer Probe

Ideal for laboratory pH and ISE measurements



Orion Star Automatic Stirrer Probe

Thermo Scientific Orion Star Stirrer probes are the answer to economical and convenient stirring.

- Use with the following Orion benchtop meters for automatic control and stirring:
  - Orion VERSA STAR
  - Orion DUAL STAR
  - Orion Star A210-series
  - Orion 3-, 4- and 5-Star/Star Plus benchtop
- Eliminates the hassles of magnetic stir plates and stir bars
- No heat transfer from stir plate
- No need to capture & wash stir bars
- No potential electrode bulb damage from stir bars
- Competitive pricing allows you to take advantage of the stirrer probe benefits at half the price of similar models
- Conveniently plugs into the back panel of the compatible benchtop meters for stirrer power, speed and control

It is so easy-to-use! Plug the stirring probe into the back panel of an Orion VERSA STAR, DUAL STAR, Star A210-series or benchtop 3-, 4- and 5- Star/Star Plus meter and place it into an electrode stand with the measuring electrode. Control the on/off function and stirring speed using the meter controls. Simply insert the stirring probe into a sample and rinse it between measurements.

Stirring Probes with Paddles

Cat. No.	Description
096019	Orion Star Stirrer probe with paddle
096021	Replacement paddles, 3 pack



Accessories

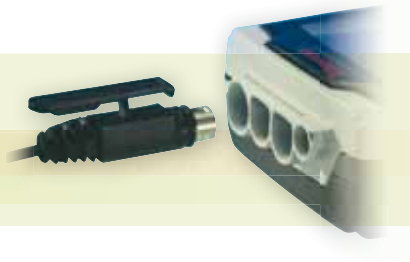
Orion DUAL STAR™ **Pages 10-11**

For easy ISE testing, pair the automatic stirrer probe with an Orion DUAL STAR meter.



Thermo Scientific Orion Electrode Connectors and Cables

Connectors that stay dry and connected



If you ever lost an electrode because of a failed connection, you'll appreciate the Orion Star Series' proprietary waterproof BNC and MiniDIN locking connectors. Adapter cables can be used to connect Orion Star Series electrodes to a wide variety of other meters.

Electrode Adapter Cables

Cat. No.	Meter Input	Electrode Connector	Adapter Needed
090033	BNC	U.S. standard	US standard to BNC adapter
91CBNC	BNC	Screw cap	Detachable cable to BNC connector
090048	BNC	Karl Fischer double pin tip	Karl Fischer adapter
090032	U.S. standard	BNC	BNC to U.S. standard adapter
91USCB	U.S. standard	Combination electrode with screw cap	Detachable cable to U.S. standard connector
91USHC	U.S. standard	Half-cell electrode with screw cap	Detachable cable to half-cell U.S. std. connector
090036	F LEMO (Metrohm)	BNC	BNC to F LEMO adapter
090035	LEMO miniature (Mettler)	BNC	BNC to LEMO miniature adapter
91CLMO	LEMO miniature (Mettler)	Screw cap	Detachable cable to LEMO connector
090034	E DIN (Knick, Schott, WTW)	BNC	BNC to E DIN adapter
91CDIN	E DIN (Knick, Schott, WTW)	Screw cap	Detachable cable to E Din connector
090037	Radiometer no. 7	BNC	BNC to radiometer adapter
91USRF	2 mm pin tip	Screw cap	Detachable cable to 2.5 mm pin tip connector
91CBNT	Other	Screw cap	Detachable cable to stripped end

Electrode Extension Cables

Cat. No.	Description
910026-WA	15 ft. extension cable, pin tip connector
910027	15 ft. extension cable, BNC connector
910028	15 ft. extension cable, 8 pin DIN connector for 917005, 917006 and 917007 ATC probes
910029-WA	15 ft. extension cable, 3.5 mm phono tip connector for 927005, 927006 and 927007
910030	15 ft. extension cable, BNC and 3.5 mm phono tip connectors for 9207BN pH/ATC Triode
910031	15 ft. extension cable, banana jack connector for 917001 and 917002 ATC probes
910032	15 ft. extension cable, 8 pin mini DIN for ATC probes for star series meters

Adapter Cables (For Star Series Electrodes to Older Meters)

Cat. No.	Description	Meter Capabilities
1010050-WA	MiniDIN ATC probe to 3.5 mm phono tip meter	Use on 310 320, 330, 350 370, 555A 550A, 535A and 162A meters
1010051	MiniDIN ATC probe to 8 pin DIN meter	Use on 210A+, 230A+ 250A+, 290A+ 410A+, 420A+ 520A+, 525A+ 710A+, 720A+ and 920A+ meters
1010800	MiniDIN DO probe to 8 pin waterproof DIN DO meter	Use on 830A 835A and 862A meters
1010801	MiniDIN DO probe to 8 pin DIN DO meter	Use on 805A+, 810A+ and 850A+ meters
1010900-WA	MiniDIN conductivity probe to 8 pin waterproof DIN conductivity meter	Use on 555A 550A, 162A 135A, and 130A meters
1010901	MiniDIN conductivity probe to 8 pin DIN conductivity meter	Use on 150A+, 145A+ 125A+, 115A+ and 105A+ meters

Thermo Scientific Orion pH Buffers and Solutions

We have the pH buffers, storage solutions, cleaning solutions, kits and pH electrode filling solutions for every application. All Orion pH buffers and standards are traceable to NIST reference materials. A wide variety of sizes are available from 15 mL single use pouches to large volume 19 L cubitainers.



pH Buffers in 475 mL (1 Pint) Bottles

Great for standard laboratory applications and everyday use

Cat. No.	Description
810199	**ROSS All-in-One pH Buffer Kit** 475 mL each of pH 4.01, 7.00 and 10.01 buffers; 475 mL of ROSS pH electrode storage solution (810001); 60 mL of pH electrode cleaning solution; and 12 mm diameter electrode storage bottle
910199	**Standard All-in-One pH Buffer Kit** 475 mL each of pH 4.01, 7.00 and 10.01 buffers; 475 mL of pH electrode storage solution (910001); and 12 mm diameter electrode storage bottle
910168	pH 1.68 buffer, NIST traceable, 475 mL
910104	pH 4.01 buffer, color coded red, NIST traceable, 475 mL
910105	pH 5.00 buffer, color coded orange, NIST traceable, 475 mL
910686	pH 6.86 buffer, DIN standard, NIST traceable, 475 mL
910107	pH 7.00 buffer, color coded yellow, NIST traceable, 475 mL
910918	pH 9.18 buffer, DIN standard, NIST traceable, 475 mL
910110	pH 10.01 buffer, color coded blue, NIST traceable, 475 mL
910112	pH 12.46 buffer, NIST traceable, 475 mL



pH Buffers in 5 x 60 mL (5 x 2 Oz) Bottles

Perfect for field measurements, occasional pH analysis or limited lab space

Cat. No.	Description
916099	**All-in-One 60 mL pH Buffer Kit** 60 mL each of pH 4.01, 7.00 and 10.01 buffers; 60 mL of pH electrode storage solution (910060); and 60 mL of pH electrode cleaning solution (900024)
9116860	pH 1.68 buffer, NIST traceable, 5 x 60 mL
910460	pH 4.01 buffer, color coded red, NIST traceable, 5 x 60 mL
916860	pH 6.86 buffer, DIN standard, NIST traceable, 5 x 60 mL
910760	pH 7.00 buffer, color coded yellow, NIST traceable, 5 x 60 mL
9191860	pH 9.18 buffer, DIN Standard, NIST traceable, 5 x 60 mL
911060	pH 10.01 buffer, color coded blue, NIST traceable, 5 x 60 mL
911260-WA	pH 12.46 buffer, NIST traceable, 5 x 60 mL



pH Buffers and Rinse Solution in Individual Use Pouches

Ideal for field measurements, pharma applications or single use buffer requirements

Cat. No.	Description
910410-WA 910425	**pH 4.01 Buffer, Color Coded Red, NIST Traceable** Individual use pouches, 10 x 15 mL Individual use pouches, 25 x 15 mL
910710 910725	**pH 7.00 Buffer, Color Coded Yellow, NIST Traceable** Individual use pouches, 10 x 15 mL Individual use pouches, 25 x 15 mL
911010 911025-WA	**pH 10.01 Buffer, Color Coded Blue, NIST Traceable** Individual use pouches, 10 x 15 mL Individual use pouches, 25 x 15 mL
911110 911125	**pH Electrode Rinse Solution** Individual use pouches, 10 x 15 mL Individual use pouches, 25 x 15 mL



pH Buffers in 19 L (5 Gallon) Cubitainers with Easy-Pour Spout

Excellent for large laboratories and multiple users

Cat. No.	Description
9104CB	pH 4.01 buffer, color coded red, NIST traceable, 19 L (5 gallon) cubitainer
9107CB	pH 7.00 buffer, color coded yellow, NIST traceable, 19 L (5 gallon) cubitainer
9110CB	pH 10.01 buffer, color coded blue, NIST traceable, 19 L (5 gallon) cubitainer





pH Electrode Storage Solution and ROSS pH Electrode Storage Solution

Get the fastest, most reliable performance from your pH electrode

Cat. No.	Description
810199	**ROSS All-in-One pH Buffer Kit** 475 mL each of pH 4.01, 7.00 and 10.01 buffers; 475 mL of ROSS pH electrode storage solution (810001); 60 mL of pH electrode cleaning solution; and 12 mm diameter electrode storage bottle
910199	**Standard All-in-One pH Buffer Kit** 475 mL each of pH 4.01, 7.00 and 10.01 buffers; 475 mL of pH electrode storage solution (910001); and 12 mm diameter electrode storage bottle
916099	**All-in-One 60 mL pH Buffer Kit** 60 mL each of pH 4.01, 7.00 and 10.01 buffers; 60 mL of pH electrode storage solution (910060); and 60 mL of pH electrode cleaning solution (900024)
810001	**ROSS pH Electrode Storage Solution** 475 mL
910001 910060 9100CB	**pH Electrode Storage Solution** 475 mL 5 x 60 mL 19 L (5 gallon) cubitainer



pH Electrode Cleaning Solutions

Specially formulated cleaning solutions for slow, dirty or clogged pH electrodes

Cat. No.	Description
900020 ⚠	**pH Electrode Cleaning Kit** – 30 mL of cleaning solution A and C, 60 mL of cleaning solution B and D, beaker and pipet
900021-WA ⚠	pH electrode cleaning solution A for protein removal, 4 x 30 mL, beaker and pipet
900022-WA	pH electrode cleaning solution B for bacteria removal, 4 x 60 mL, beaker and pipet
900023 ⚠	pH electrode cleaning solution C for general cleaning, 4 x 30 mL, beaker and pipet
900024	pH electrode cleaning solution D for general cleaning and oil and grease removal, 4 x 60 mL, beaker and pipet
510015	Stain lifter solution for no cal fill solution and ORP standard stain removal, 60 mL



pH Specialty Solutions and ORP Standards

Cat. No.	Description
700001	**Pure Water Low Ionic Strength pH Test Kit –** 4 x 475 mL of pH 6.97 buffer, 2 x 475 mL of pH 4.10 buffer, 2 x 60 mL of pHISA adjuster and app note
700003	Pure water pHISA low ionic strength adjuster, 5 x 60 mL
700402	Pure water pH 4.10 buffer B for low ionic strength pH samples, 4 x 475 mL
700702	Pure water pH 6.97 buffer A for low ionic strength pH samples, 4 x 475 mL
700902	Pure water pH 9.15 buffer C for low ionic strength pH samples, 4 x 475 mL
700010	**Total Alkalinity Test Kit –** 475 mL of alkalinity reagent (700011-WA), 475 mL of alkalinity standard (700012), conversion chart and app note
700011-WA	Total alkalinity reagent refill, 4 x 475 mL
700012	Total alkalinity standard/control refill, 475 mL
967901	**ORP Standard**, +420 mV vs. standard hydrogen electrode (EH), +220 mV vs. Ag/AgCl electrode using 900011 fill solution, 475 mL
967961	**ORP Standard**, +420 mV vs. standard hydrogen electrode (EH), +220 mV vs. Ag/AgCl electrode using 900011 fill solution, 5 x 60 mL



Pure Water® pH Test Kit: Get fast, accurate pH results in high purity waters such as well, rain, distilled/deionized, boiler feed and process. The kit includes special low ionic strength buffers and pHISA additive that increases sample ionic strength without changing the pH. For best results, a high quality pH electrode such as the ROSS Ultra 8102BNUWP is recommended (purchase separately).



Total Alkalinity Test Kit: A two-step direct measurement of total alkalinity and pH. Calibrate for pH, add alkalinity reagent and read total alkalinity of 0-200 ppm $CaCO_3$ from the included pH conversion chart.

Thermo Scientific Orion Electrode Fill Solutions and Accessories



pH Electrode and Reference Electrode Fill Solutions

Ensure the proper performance and function from your electrode by using our specially formulated fill solutions

Cat. No.	Description	Use With Electrodes
810007	ROSS electrode fill solution, 3 M KCl, 5 x 60 mL	**ROSS Ultra, ROSS and Micro ROSS Electrodes** 800300, 800500U, 8102BN, 8102BNUWP, 8103BN, 8103BNUWP, 8104BN, 8104BNUWP, 8115BN, 8115BNUWP, 8135BN, 8135BNUWP, 815600, 8156BNUWP, 8157BNU, 8157BNUMD, 8157UWMMD, 8163BNWP, 8165BNWP, 8172BNWP, 8175BNWP, 8220BNWP, 8302BNUMD
900011	Silver Chloride pH electrode fill solution, 4 M KCl with Ag/AgCl, 5 x 60 mL	**Standard, Specialty, Single Junction Refillable Green, Micro and ORP Electrodes** 9102BNWP, 9103BNWP, 9104BNWP, 9156BNWP, 9157BN, 9157BNMD, 9162BNWP, 9165BNWP, 9172BNWP, 9180BN, 9180BNMD, 9678BNWP, 9778BNWP, 9780SC, 9810BN, 9826BN, 9863BN, GS9156BNWP
900004	Silver Chloride pH electrode (low level) fill solution, 2 M KCl with Ag/AgCl, 5 x 60 mL	**Standard, Specialty, Single Junction Refillable Green, Micro and ORP Electrodes (low ionic strength samples)** 9102BNWP, 9103BNWP, 9104BNWP, 9156BNWP, 9157BN, 9157BNMD, 9162BNWP, 9165BNWP, 9172BNWP, 9180BN, 9180BNMD, 9678BNWP, 9778BNWP, 9780SC, 9810BN, 9826BN, 9863BN, GS9156BNWP
910008-WA	Double junction pH electrode fill solution, 3 M KCl, 5 x 60 mL	**Double Junction, Double Junction Refillable Green and KNIpHE Electrodes** 9102DJWP, 9110DJWP, 9120APWP, GD9156BNWP
510011	No Cal pH electrode fill solution, 5 x 60 mL	**No Cal Electrodes** 5107BNMD, 5107NC
610001	pHuture pH electrode fill solution, 5 x 60 mL	**pHuture Electrodes**
900001	Single junction reference electrode fill solution, equitransferent solution with Ag/AgCl, 5 x 60 mL	**Single Junction Reference Electrode** 900100
900002	Double junction reference electrode inner fill solution, equitransferent solution with Ag/AgCl, 5 x 60 mL	**Double Junction Reference Electrode** 900200
900003	Double junction reference electrode outer fill solution, 10 % KNO_3, 5 x 60 mL	**Double Junction Reference Electrode** 900200

pH Accessories

Cat. No.	Description
020017	No Cal electrode storage chamber
810017	Storage sleeve and base for 12 mm x 120 mm electrodes
910003	12 mm electrode storage bottles, 3 pack
910004	8 mm electrode storage bottles, 3 pack
910005	Bulb guard for glass pH electrode, 5 pack
910006	6 mm electrode storage bottles, 3 pack

⚠ Signifies a hazardous solution.
See terms and conditions for important shipping information at www.thermoscientific.com/water.

Visit the WAI Online Library on **www.thermoscientific.com/water** for the most up-to-date MSDS and Certificate of Analysis files for Orion solutions.



Please visit
www.thermoscientific.com/waterlibrary
for more product information.



Thermo Scientific Orion Ion Selective Electrodes

Ion Selective Electrodes (ISE) are easy to use and provide you the best performance and reliability

Measurement by ISE can be performed in virtually every laboratory. ISEs measure ion concentrations in samples such as water, food, pharmaceuticals and biological samples. There have been many analytical methods that have been developed and published world-wide for the use of ISEs. The variety of methods available is the main advantage of using ISE technology.

Efficient and Economical

Electrode measurements are simpler and faster than other analytical techniques. Time consuming sample steps such as filtration and distillations are rarely needed. Analysis time is typically under 1 minute. Typically the cost per test is only a few cents. Compared to other methods such as atomic absorption or ion chromatography, there is a small setup cost and it does not require additional expensive readout equipment. Sample color or turbidity do not affect the measurement.

Measurement Techniques

Direct Measurement is a simple procedure for measuring a large number of samples. Each sample only requires one reading. Only a small sample volume is required. Calibration is performed on a series of standards. The concentration is then determined by comparison to the standards. Ionic strength adjustor is added to all solutions to ensure samples and standards have similar ionic strength, proper pH and reduce the effect of interfering ions. Orion ISE meters calculate and store the calibration curves.

Low Level Measurement is a similar method to direct measurement. It is recommended when the sample is not in the linear response range. A minimum 3 point calibration is recommended to compensate for the non-linear response. Calibration is performed in one beaker reducing the chance of cross contamination of the standards.

Know Addition is a useful method for measuring samples since calibration is not required. This method is recommended when measuring only a few samples, when samples have a high ionic strength (>0.1 M) or when there is a complicated background matrix. An aliquot of standard solution containing the measured species is added to the sample. The sample concentration is determined by the changes in potential before and after the addition. Orion ISE meters automatically calculate the result.

Analate Subtraction is also a useful method for measuring samples since calibration is not required. The electrodes are immersed in a reagent solution that contains a species that the electrode senses and then it reacts with the sample. It is useful when sample size is small, for samples for which a standard is difficult to prepare, and for viscous or very concentrated samples. The method is not suited for very diluted samples. It is also necessary to know the stoichiometric ration between sample and standard.

Titrations are quantitative analytical techniques for measuring the concentration of a species by incremental addition of a reagent (titrant) that reacts with the sample species. Sensing electrodes can be used for determination of the titration end point. Ion selective electrodes are useful as end point detectors because they are unaffected by sample color or turbidity.

Half Cell Ion Selective Electrodes

Solid-State Half-Cell ISE Epoxy body Require separate reference Temperature range 0-80 °C	Fluoride, Chloride, Cyanide, Silver-Sulfide, Lead, Bromide, Cadmium, Cupric, Iodide, Thiocyanate
Plastic Membrane Half-Cell ISE PVC body Require separate reference Temperature range 0-40 °C	Nitrate, Potassium, Calcium, Ammonium, Fluoroborate
ROSS® Half-Cell ISE Glass body Requires ROSS half-cell reference Temperature range 0-100 °C	Sodium

Combination Ion Selective Electrodes

Sure-Flow® Reference makes electrode easy to clean and long lasting

Ionplus® Sure-Flow® Combination ISE Epoxy body Temperature range 0-80 °C	Fluoride, Chloride, Cyanide, Silver-Sulfide, Lead, Bromide, Cadmium, Cupric, Iodide
Ionplus Sure-Flow Combination Plastic Membrane ISE PVC body Temperature range 0-40 °C	Nitrate, Potassium, Calcium
ROSS Sure-Flow® Combination ISE Glass body Temperature range 0-100 °C	Sodium

Various ISE Applications

Agriculture	Nitrate, chloride, ammonia, potassium, calcium, iodide, cyanide in soil, fertilizer and fedstuffs
Biomedical	Calcium, carbon dioxide and ammonia in biological cultures (not in vitro or in vivo)
Dairy Products	Chloride, fluoride, iodide, calcium, potassium
Dental	Fluoride, calcium in teeth and toothpaste
Education	Various ISEs in teaching and research labs
Food & Beverage	Chloride, nitrate, sodium, calcium, potassium
Geology	Fluoride and calcium in rocks
Metal Plating	Fluoride, copper, cyanide, chloride
Plant Tissue	Nitrate, chloride, fluoride, iodide, cyanide, calcium, potassium and sodium
Power, Steam Generators	Chloride, sodium and residual chlorine in boiler feeds
Pulp and Paper	Sodium, chloride, sulfide and calcium in liquors
Soil	Nitrate, calcium, sodium, potassium, bromide, chloride, ammonia, fluoride
Water, Drinking	Nitrate, residual chlorine, fluoride, cyanide, sulfide, ammonia
Water, Sea	Sodium, chloride, fluoride, nitrate, ammonia
Water, Waste	Nitrate, ammonia, residual chlorine, sulfides
Wine	Potassium, sodium, fluoride, calcium



Thermo Scientific Orion Ion Selective Electrode Selection Guide

Species	Cat. No.	Construction	Measurement Range	Optimum Temperature Range	Required Reference Electrode	Reference Filling Solution	Calibration Standards	Required ISA
Ammonia standard (NH_3) EPA	9512BNWP [1]	Gas sensing combination	5 x 10^{-7} to 1.0 M 0.01 to 17,000 ppm	0 to 50 °C	Included	951202	0.1 M NH_4Cl / 951006	951211 ⚠
Ammonia high performance EPA	9512HPBNWP [1]	Gas sensing combination	5 x 10^{-7} to 1.0 M 0.01 to 17,000 ppm	0 to 50 °C	Included	951209	0.1 M NH_4Cl / 951006	951210 ⚠
Ammonium (NH_4^+)	931801 [8]	Plastic membrane half-cell	5 x 10^{-7} to 1.0 M 0.01 to 17,000 ppm	0 to 40 °C	900200	900002 inner/ 900018-WA outer	1000 ppm as N / 951007	–
Bromide (Br^-) ionplus Design	9635BNWP [1]	ionplus sure-flow solid state combination	5 x 10^{-6} to 1.0 M 0.40 to 79,900 ppm	0 to 80 °C	Included	900063	0.1 M NaBr / 943506	940011
Bromide (Br^-)	9435BN [2] 9435SC [3]	Solid state half-cell	5 x 10^{-6} to 1.0 M 0.40 to 79,900 ppm	0 to 80 °C	900200	900002 inner / 900003 outer	0.1 M NaBr / 943506	940011
Cadmium (Cd^{2+}) ionplus Design	9648BNWP [1]	ionplus sure-flow solid state combination	1 x 10^{-7} to 0.1 M 0.01 to 11,200 ppm	0 to 80 °C	Included	900061	Consult user guide	940011
Cadmium (Cd^{2+})	9448BN [2] 9448SC [3]	Solid state half-cell	1 x 10^{-7} to 0.1 M 0.01 to 11,200 ppm	0 to 80 °C	900200	900002 inner / 900003 outer	Consult user guide	940011
Calcium (Ca^{2+}) ionplus Design	9720BNWP [1]	ionplus sure-flow plastic membrane combination	5 x 10^{-7} to 1.0 M 0.02 to 40,100 ppm	0 to 40 °C	Included	900061	0.1 M $CaCl_2$ / 922006 100 ppm $CaCO_3$ / 923206	932011
Calcium (Ca^{2+})	9320BN [2]	Plastic membrane half-cell	5 x 10^{-7} to 1.0 M 0.02 to 40,100 ppm	0 to 40 °C	900100	900011	0.1 M $CaCl_2$ / 922006 100 ppm $CaCO_3$ / 923206	932011
Carbon Dioxide (CO_2)	9502BNWP [1]	Gas sensing combination	1 x 10^{-4} to 1 x 10^{-2} M 4.4 to 440 ppm	0 to 50 °C	Included	950202	0.1 M $NaHCO_3$ / 950206 1000 ppm as $CaCO_3$ / 950207	950210
Chloride (Cl^-) ionplus Design EPA	9617BNWP [1]	ionplus sure-flow solid state combination	5 x 10^{-5} to 1.0 M 1.8 to 35,500 ppm	0 to 80 °C	Included	900062	0.1 M NaCl / 941706 100 ppm Cl^- / 941707 1000 ppm Cl^- / 941708	940011 or 941709 / CISA ⚠
Chloride (Cl^-) EPA	9417BN [2] 9417SC [3]	Solid state half-cell	5 x 10^{-5} to 1.0 M 1.8 to 35,500 ppm	0 to 80 °C	900200	900002 inner / 900003 outer	0.1 M NaCl / 941706 100 ppm Cl^- / 941707 1000 ppm Cl^- / 941708	940011 or 941709 / CISA ⚠
Chlorine (Cl_2) EPA	9770BNWP [1] 9770SC [3]	Solid state combination	1 x 10^{-7} to 3 x 10^{-4} M 0.01 to 20 ppm	0 to 50 °C	Included	None required	100 ppm as Cl_2 / 977007	977010 / iodide reagent 977011 / acid reagent ⚠
Cupric (Cu^{2+}) ionplus Design	9629BNWP [1]	ionplus sure-flow solid state combination	1 x 10^{-8} to 0.1 M 6.4 x 10^{-4} to 6350 ppm	0 to 80 °C	Included	900063	0.1 M $Cu(NO_3)_2$ / 942906	940011
Cupric (Cu^{2+})	9429BN [2] 9429SC [3]	Solid state half-cell	1 x 10^{-8} to 0.1 M 6.4 x 10^{-4} to 6350 ppm	0 to 80 °C	900200	900002 inner / 900003 outer	0.1 M $Cu(NO_3)_2$ / 942906	940011
Cyanide (CN^-) ionplus Design EPA	9606BNWP [1]	ionplus sure-flow solid state combination	8 x 10^{-6} to 1 x 10^{-2} M 0.2 to 260 ppm	0 to 80 °C	Included	900062	Consult user guide	951011 ⚠
Cyanide (CN^-) EPA	9406BN [2] 9406SC [3]	Solid state half-cell	8 x 10^{-6} to 1 x 10^{-2} M 0.2 to 260 ppm	0 to 80 °C	900200	900002 inner / 900003 outer	Consult user guide	951011 ⚠
Fluoride (F^-) ionplus Design EPA	9609BNWP [1]	ionplus sure-flow solid state combination	1 x 10^{-6} M to saturated 0.02 ppm to saturated	0 to 80 °C	Included	900061	0.1 M NaF / 940906 100 ppm F^- / 940907 1 ppm F^- w/ TISAB II / 040906 2 ppm F^- w/ TISAB II / 040907 10 ppm F^- w/ TISAB II / 040908	940909 / TISAB II 940911 / TISAB III
Fluoride (F^-) EPA	9409BN [2] 9409SC [3]	Solid state half-cell	1 x 10^{-6} M to saturated 0.02 ppm to saturated	0 to 80 °C	900100	900001	0.1 M NaF / 940906 100 ppm F^- / 940907 1 ppm F^- w/ TISAB II / 040906 2 ppm F^- w/ TISAB II / 040907 10 ppm F^- w/ TISAB II / 040908	940909 / TISAB II 940911 / TISAB III

EPA Compliant with EPA testing method

⚠ Signifies a hazardous solution. See terms and conditions for important shipping information at www.thermoscientific.com/water

Species	Cat. No.	Construction	Measurement Range	Optimum Temperature Range	Required Reference Electrode	Reference Filling Solution	Calibration Standards	Required ISA
Fluoroborate (BF_4^-)	9305BN [2]	Plastic membrane half-cell	7 x 10^{-6} to 1.0 M 0.6 to 86,800 ppm	0 to 40 °C	900200	900002 inner / dilute ISA outer	Consult user guide	930711
Iodide (I^-) ionplus Design	9653BNWP [1]	ionplus® sure-flow® solid state combination	5 x 10^{-8} to 1.0 M 5 x 10^{-3} to 127,000 ppm	0 to 80 °C	Included	900063	0.1 M NaI / 945306	940011
Iodide (I^-)	9453BN [2] 9453SC [3]	Solid state half-cell	5 x 10^{-8} to 1.0 M 5 x 10^{-3} to 127,000 ppm	0 to 80 °C	900200	900002 inner / 900003 outer	0.1 M Na / 945306	940011
Lead (Pb^{2+}) ionplus Design	9682BNWP [1]	ionplus sure-flow solid state combination	1 x 10^{-6} to 0.1 M 0.2 to 20,700 ppm	0 to 80 °C	Included	900062	0.1 M $Pb(ClO_4)_2$ / 948206 0.1 M Na_2SO_4 / 948207	Consult instruction manual
Lead (Pb^{2+})	9482BN [2] 9482SC [3]	Solid state half-cell	1 x 10^{-6} to 0.1 M 0.2 to 20,700 ppm	0 to 80 °C	900200	900002 inner / 900003 outer	0.1 M $Pb(ClO_4)_2$ / 948206 0.1 M Na_2SO_4 / 948207	Consult instruction manual
Nitrate (NO_3^-) ionplus Design (EPA)	9707BNWP [1]	ionplus sure-flow plastic membrane combination	7 x 10^{-6} to 1.0 M 0.1 to 14,000 ppm as N	0 to 40 °C	Included	900046	0.1 M $NaNO_3$ / 920706 1000 ppm N / 920707 100 ppm N / 930707	930711 or 930710 / nitrate ISS
Nitrate (NO_3^-) (EPA)	9307BNWP [1]	Plastic membrane half-cell	7 x 10^{-6} to 1.0 M 0.1 to 14,000 ppm as N	0 to 40 °C	900200	900002 inner / 900046 or ISA outer	0.1 M $NaNO_3$ / 920706 1000 ppm N / 920707 100 ppm N / 930707	930711 or 930710 / nitrate ISS
Potassium (K^+) ionplus Design	9719BNWP [1]	ionplus sure-flow plastic membrane combination	1 x 10^{-6} to 1.0 M 0.04 to 39,000 ppm	0 to 40 °C	Included	900065	0.1 M KCl / 921906	931911
Potassium (K^+)	9319BN [2]	Plastic membrane half-cell	1 x 10^{-6} to 1.0 M 0.04 to 39,000 ppm	0 to 40 °C	900200	900002 inner / dilute ISA outer	0.1 M KCl / 921906	931911
Silver/Sulfide (Ag^+/S^{2-}) ionplus Design	9616BNWP [1]	ionplus sure-flow solid state combination	1 x 10^{-7} to 1.0 M 0.01 to 107,900 ppm as Ag^+ 0.003 to 32,100 ppm as S^{2-}	0 to 80 °C	Included	900062 for Ag^+/S^{2-} 900067 for Ag^+ 900061 for S^{2-}	Consult user guide	940011 for Ag^+ 941609 for S^{2-} ⚠
Silver/Sulfide (Ag^+/S^{2-})	9416BN [2] 9416SC [3]	Solid state half-cell	1 x 10^{-7} to 1.0 M 0.01 to 107,900 ppm as Ag^+ 0.003 to 32,100 ppm as S^{2-}	0 to 80 °C	900200	900002 inner / 900003 outer	Consult user guide	940011 for Ag^+ 941609 for S^{2-} ⚠
Sodium (Na^+)	8611BNWP [1]	ROSS® sure-flow combination	1 x 10^{-6} M to saturated 0.02 ppm to saturated	0 to 100 °C	Included	900010 or 900012 for low level Na^+	10 ppm Na^+ / 941105 100 ppm Na^+ / 941107 1000 ppm Na^+ / 841108 KA standard kit, 1 M NaCl with ISA / 650700 0.1 M NaCl / 941706	841111 841113 / reconditioning solution
Sodium (Na^+)	8411BN [2]	ROSS half-cell	1 x 10^{-6} M to saturated 0.02 ppm to saturated	0 to 100 °C	800300 or 800500U	900010 or 900012 for low level Na^+	10 ppm Na^+ / 941105 100 ppm Na^+ / 941107 1000 ppm Na^+ / 841108 KA standard kit, 1 M NaCl with ISA / 650700 0.1 M NaCl / 941706	841111 841113 / reconditioning solution
Sodium (Na^+)	9811BN [2]	Micro combination	1 x 10^{-6} M to saturated 0.02 ppm to saturated	0 to 80 °C	Included	900004	0.1 M NaCl / 941706	841111
Surfactant	9342BN [2]	Plastic membrane half-cell	Endpoint indicator	0 to 40 °C	900200	900002 inner / 810007 outer	0.5 M Hyamine titrant / 654201	654203 / sample additive
Thiocyanate (SCN^-)	9458BN [2]	Solid state half-cell	5 x 10^{-6} to 1.0 M 0.29 to 58,100 ppm	0 to 50 °C	900200	900002 inner / 900003 outer	Consult user guide	940011



Key Information
1 BNC Waterproof Connector **2** BNC Connector
3 Screw Cap Connector, requires separate cable
8 Module only, requires separate 93 series electrode handle (9300BNWP or 9300SC)
All cap diameters are 16 mm at bottom of cap
All cable lengths are 1 meter

Thermo Scientific Orion Fluoride Ion Selective Electrodes

The standard in fluoride ion analysis – EPA compliant

Approved ASTM Method for Fluoride in Drinking Water and Wastewater

Analyze free fluoride ions in aqueous solutions reliably at low limits of detection. Measurements are quick, simple, accurate and economical.

Thermo Scientific Orion fluoride electrodes feature high quality lanthanum fluoride pellet sensors. Choose from combination electrodes or half cell designs. The fluoride half cell electrode requires a separate half cell reference electrode.

Other Applications for Fluoride Electrodes

- **Phosphate:** Gran plot titration can determine phosphate in applications from animal feed to cleaning solutions to food and beverage
- **Ammonium Bifluoride:** Multiple known addition (MKA) titration method determines levels without need of removing interfering heavy metal ions
- **Aluminum:** Gran plot titration can determine micro and semi micro levels of aluminum

Accessories and Solutions

A full line of supporting accessories is offered to meet your measurement needs. A variety of calibration standards are available. Low level standards have the added convenience of being pre-made with total ionic strength adjustor (TISAB) and requiring that TISAB be added only to your samples. TISAB II requires a 50:50 dilution with the sample and is available in gallon bottles. TISAB III is a concentrate and requires a 1:10 dilution.

Convenient combination with reference



Combination fluoride ISE with Sure-Flow reference

- Fluoride surface can be easily cleaned using toothpaste and a lint-free wipe
- Built-in Sure-Flow reference provides fast and stable readings

Half cell reference design provides flexibility

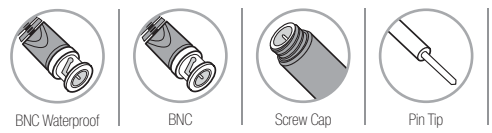


Half cells – Fluoride ISE and Sure-Flow™ reference

- Fluoride surface can be easily cleaned using toothpaste and a lint-free wipe
- Use with the 900100 single junction or 900200 double junction reference electrodes

Cat. No.	9609BNWP	9409BN 9409SC	900100
Measurement Range	1 x 10^{-6} M to saturated 0.02 ppm to saturated	1 x 10^{-6} M to saturated 0.02 ppm to saturated	–
Temp. Range	0 to 80 °C	0 to 80 °C	0 to 100 °C
Connector Type	BNC Waterproof	BNC Screw Cap	Pin Tip

Cat. No.	Recommended Accessories
940906	0.1 M NaF standard, 475 mL
940907	100 ppm fluoride standard, 475 mL
040906	1 ppm fluoride standard with TISAB II, 475 mL
040907	2 ppm fluoride standard with TISAB II, 475 mL
040908	10 ppm fluoride standard with TISAB II, 475 mL
940909	TISAB II, 1 gallon
940999	TISAB II, 4 x 1 gallon
940911	TISAB III concentrate, 475 mL
900061	Optimum results A electrode fill solution for 9609BNWP, 5 x 60 mL
900001	Fill solution for 900100 used with 9409BN/9409SC, 5 x 60 mL



Thermo Scientific Orion Ammonia Ion Selective Electrodes

Compliant with EPA testing methods

EPA Approved ASTM D1426 Method for Ammonia in Wastewater

Measurements are quick, simple, accurate and economical.

Thermo Scientific Orion ammonia electrodes feature time-tested membrane technology. Choose from high performance and standard designs.

The high performance ammonia electrode offers linear response down to the lower limits of detection. The electrode can detect down to 0.01 ppm. The high performance ammonia electrode can achieve response times of 1 minute in samples of 1 ppm or higher. It is rugged and meets the rigorous requirements of waste water and drinking water operators. Supplied with pack of 20 loose membranes, 1 pre-assembled outer body and 2 bottles of fill solution.

Other Applications for Ammonia Electrodes

- **Ammonium or Nitrogen:** Measure ammonium after conversion to ammonia or nitrogen after Kjeldahl digestion of sample

Accessories and Solutions

A full line of supporting accessories is offered to meet your measurement needs.

High performance ammonia electrode



BEST

Pre-assembled body and membrane simplifies use and achieves optimum performance

Standard ammonia electrode



BETTER

Provides reliable results at mid to high ammonia levels

Cat. No.	9512HPBNWP	9512BNWP
Measurement Range	5 x 10^{-7} to 1.0 M 0.01 to 17,000 ppm	5 x 10^{-7} to 1.0 M 0.01 to 17,000 ppm
Temp. Range	0 to 50 °C	0 to 50 °C
Connector Type	BNC Waterproof	BNC Waterproof

HP Electrode

Cat. No.	Recommended Accessories
951214	Loose membranes for HP electrodes, box of 20
951215	Pre-assembled outer body and membrane cap assembly for HP electrodes, 3 pack
951210	pH adjusting ISA, for samples with no metallic ions, 475 mL
951211	pH adjusting ISA, for samples containing metallic ions, 475 mL
951213	Ammonia electrode storage solution, 475 mL
951209	HP ammonia electrode filling solution, 60 mL
951006	0.1 M NH_4Cl standard, 475 mL
951007	1000 ppm ammonia as nitrogen standard, 475 mL

Standard Electrode

Cat. No.	Recommended Accessories
951204	Loose membranes for standard electrodes, box of 20
951205	Bonded membranes for standard electrodes, pack of 3
951210	pH adjusting ISA, for samples with no metallic ions, 475 mL
951211	pH adjusting ISA, for samples containing metallic ions, 475 mL
951213	Ammonia electrode storage solution, 475 mL
951202	Standard ammonia electrode filling solution, 60 mL
951006	0.1 M NH_4Cl standard, 475 mL
951007	1000 ppm ammonia as nitrogen standard, 475 mL



BNC Waterproof

Thermo Scientific Orion Nitrate Ion Selective Electrodes

Compliant with EPA testing methods

The Easy Way to Measure Nitrate Levels in Drinking Water, Wastewater and Soils

Analyze free nitrate ions in aqueous solutions reliably at low limits of detection. Measurements are quick, simple, accurate and economical.

Choose from combination electrodes or half cell designs. The nitrate half cell electrode requires a separate half cell reference electrode.

Other Applications for Nitrate Electrodes

- **Nitric Acid:** Multiple known addition (MKA) titration method determines levels without need of removing interfering heavy metal ions.

Accessories and Solutions

A full line of supporting accessories is offered to meet your measurement needs. A variety of calibration standards are available. Replacement modules are available individually or in convenient three packs.

Convenient combination electrode with replaceable module



Combination nitrate ISE with Sure-Flow™ reference

- Sure-Flow reference provides stable readings and is easy to clean
- Convenient with small sample sizes

Half cell reference design provides flexibility



Half cells – Nitrate ISE and Sure-Flow™ reference

- Reference junction is reliable and easy to maintain
- Replaceable module provides convenience

Cat. No.	9707BNWP	9307BNWP	900200
Measurement Range	7 x 10^{-6} to 1.0 M 0.1 to 14,000 ppm as N	7 x 10^{-6} to 1.0 M 0.1 to 14,000 ppm as N	–
Temp. Range	0 to 40 °C	0 to 40 °C	0 to 100 °C
Connector Type	BNC Waterproof	BNC Waterproof	Pin Tip

Cat. No.	Recommended Accessories
900046	Optimum results F electrode fill solution, 5 x 60 mL. For 9707BNWP and outer fill solution for 900200
900002	Inner chamber fill solution for 900200, 5 x 60 mL
920706	0.1 M $NaNO_3$ standard solution, 475 mL
920707	1000 ppm nitrate as nitrogen standard, 475 mL
930707	100 ppm nitrate as nitrogen standard, 475 mL
930711	Nitrate ionic strength adjustor (ISA), 475 mL
930710	Nitrate interference suppressor solution (NISS), 475 mL
970701	Replacement module for 9707BNWP (1 each)
930701	Replacement module for 9307BNWP (pack of 3)
930702	Replacement module for 9307BNWP (1 each)


BNC Waterproof


Pin Tip

Thermo Scientific Orion Chloride Ion Selective Electrodes

Compliant with EPA testing methods

Approved ASTM Method for Chloride in Wastewater

Easily and reliably analyze free chloride ions in aqueous solutions. Provides quick, accurate and economical measurements. Rugged epoxy body design ensures durability of electrode.

Other Applications for Chloride Electrodes

- **Salt:** Multiple known addition can be used to determine salt levels in food samples
- **Hydrochloric Acid:** First derivative titration can determine HCl concentrations

Accessories and Solutions

Thermo Scientific offers a full line of accessories to enhance your measurements. These include calibration standards, two ionic strength adjustors – one to adjust background ionic strength (ISA) and another to minimize complexation interferences and adjust background ionic strength (CISA), and choice of fill solutions depending on sample composition.

Convenient combination with Sure-Flow reference



Combination chloride ISE with Sure-Flow® reference

- Durable reference pellet which can be polished to restore electrode performance
- Sure-Flow reference provides easy maintenance and optimum performance

Half cell reference design provides flexibility

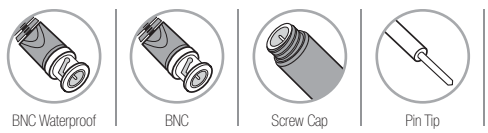


Half cells - Chloride ISE and double junction Sure-Flow reference

- Double junction reference isolates inner reference from sample
- Designed for precision measurements

Cat. No.	9617BNWP	9417BN 9417SC	900200
Measurement Range	5 x 10^{-5} to 1.0 M 1.8 to 35,000 ppm	5 x 10^{-5} to 1.0 M 1.8 to 35,000 ppm	–
Temp. Range	0 to 80 °C	0 to 80 °C	0 to 100 °C
Connector Type	BNC Waterproof	BNC Screw cap	Pin Tip

Cat. No.	Recommended Accessories
940011	Chloride ionic strength adjustor (ISA), 475 mL
941709	Chloride CISA reagent pack, 2 x 2 L
941706	0.1 M NaCl standard, 475 mL
941708	1000 ppm chloride standard, 475 mL
941707	100 ppm chloride standard, 475 mL
900062	Optimum results B fill solution for 9617BNWP, 5 x 60 mL
900017	Chloride electrode fill solution, 5 x 60 mL, for samples more concentrated than 10^{-2} M
900003	Outer chamber fill solution for 900200, 5 x 60 mL
900002	Inner chamber fill solution for 900200, 5 x 60 mL
948201	Polishing strips, pack of 24



Thermo Scientific Orion ROSS® Sodium Ion Selective Electrodes

ROSS Fast Response and Stability

Comes with Complete Solution Kit Containing Standards, Reagents, ISA and More!

Quick, accurate and economical measurements of free sodium ions in aqueous solutions. Chemical resistant glass body.

Applications for Sodium Electrodes

The sodium electrode is commonly used to measure samples such as food, beverages and animal feed.

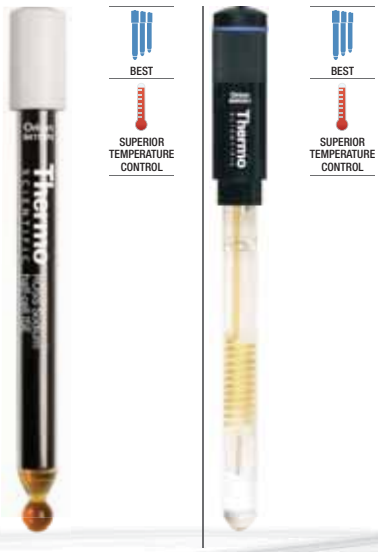
Accessories and Solutions

Thermo Scientific provides you all the accessories you need for sodium measurement when you purchase a ROSS sodium electrode. Each electrode comes with electrode fill solution, sodium ionic strength adjustor, 3 different sodium standards, sodium electrode reconditioning solution and sodium electrode storage solution.

Convenient combination with Sure-Flow reference



Half cell reference design provides flexibility with choice of ROSS references



Combination Ross Sodium ISE with Sure-Flow® reference

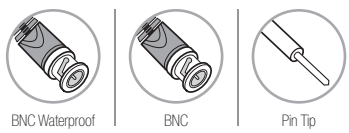
- Unique redox ROSS reference system provides fast response, better stability and accuracy than conventional sodium electrodes
- Sure-Flow reference prevents clogging while giving fast, stable readings

Half cells - Chloride ISE and double junction Sure-Flow reference and optimum performance

- Choice of ROSS reference systems: ROSS Sure-Flow reference (800300) with easy to clean and reliable junction
- ROSS Ultra® reference (800500U) with ROSS performance and extended life with 2 year warranty

Cat. No.	8611BNWP	8411BN	800300 800500U
Measurement Range	1 x 10^{-6} M to saturated 0.02 ppm to saturated	1 x 10^{-6} M to saturated 0.02 ppm to saturated	–
Temp. Range	0 to 100 °C	0 to 100 °C	0 to 100 °C
Connector Type	BNC Waterproof	BNC	Pin Tip

Cat. No.	Recommended Accessories
941706	0.1 M NaCl standard, 475 mL
841108	1000 ppm sodium standard, 475 mL
941107	100 ppm sodium standard, 475 mL
941105	10 ppm sodium standard, 475 mL
650700	Known addition kit – 3 x 475 mL of 1 M NaCl standard with ISA and 1 x 475 mL ISA
841109	Know addition standard, 1000 ppm as Na^+ with ISA, 475 mL
841111	Sodium ionic strength adjustor (ISA), 475 mL
841113	Sodium electrode reconditioning solution, 475 mL
841101	Sodium electrode storage solution, 475 mL
900010	Sodium electrode fill solution, 5 x 60 mL
900012	Sodium electrode fill solution for low sodium levels (below 10^{-5} M or 0.2 ppm)



ISE Calibration Standards, Ionic Strength Adjusters (ISA), Reagents and Fill Solutions

All ISE Standards are NIST traceable



Cat. No.	Description
Ammonia, Standard and High Performance	
951006	0.1 M NH_4Cl Ammonia standard, 475 mL
951007	1000 ppm Ammonia as Nitrogen (N) standard, 475 mL
951207	100 ppm Ammonia as Nitrogen (N) standard, 475 mL
951211 ⚠	Ammonia Ionic Strength Adjuster (ISA) with pH-indicating blue dye, 475 mL
951210 ⚠	Ammonia low level Ionic Strength Adjuster (ISA) with pH-indicating blue dye, 475 mL
951213	Ammonia electrode storage solution, 475 mL
951209	Ammonia high perform electrode fill solution, 60 mL
951202	Ammonia standard electrode fill solution, 60 mL
Ammonium	
951007	1000 ppm Ammonium as Nitrogen (N) standard, 475 mL
900018-WA	Ammonium electrode fill solution, 5 x 60 mL
Bromide	
943506	0.1 M NaBr Bromide standard, 475 mL
940011	Bromide Ionic Strength Adjuster (ISA), 475 mL
900063	Optimum results D fill solution for Bromide electrode, 5 x 60 mL
Cadmium	
940011	Cadmium Ionic Strength Adjuster (ISA), 475 mL
900061	Optimum results A fill solution for Cadmium electrode, 5 x 60 mL
Calcium	
922006	0.1 M $CaCl_2$ Calcium standard, 475 mL
923206	100 ppm as $CaCO_3$ Calcium standard, 475 mL
932011	Calcium Ionic Strength Adjuster (ISA), 475 mL
900061	Optimum results A fill solution for Calcium electrode, 5 x 60 mL
Carbon Dioxide	
950206	0.1 M $NaHCO_3$ Carbon Dioxide standard, 475 mL
950207	1000 ppm as $CaCO_3$ Carbon Dioxide standard, 475 mL
950210	Carbon Dioxide Ionic Strength Adjuster (ISA), 475 mL
950202	Carbon Dioxide electrode fill solution, 60 mL
Chloride	
941706	0.1 M NaCl Chloride standard, 475 mL
941708	1000 ppm Chloride standard, 475 mL
941707	100 ppm Chloride standard, 475 mL
940011	Chloride Ionic Strength Adjuster (ISA), 475 mL
941709 ⚠	Chloride Complexation Ionic Strength Adjuster (CISA) reagent pack, 2 x 1 L
900062	Optimum results B fill solution for Chloride electrode, 5 x 60 mL
900017	Chloride electrode fill solution, 5 x 60 mL



Chlorine, Residual	
977007	100 ppm as Cl_2 Residual Chlorine standard, 475 mL
977011 ⚠	Residual Chlorine acid reagent, 475 mL
977010	Residual Chlorine iodide reagent, 5 x 50 mL
Cupric	
942906	0.1 M $Cu(NO_3)_2$ Cupric standard, 475 mL
940011	Cupric Ionic Strength Adjuster (ISA), 475 mL
900063	Optimum results D fill solution for Cupric electrode, 5 x 60 mL
Cyanide	
951011 ⚠	Cyanide alkaline reagent, 10 N NaOH, 475 mL
900062	Optimum results B fill solution for Cyanide electrode, 5 x 60 mL
Fluoride	
940906	0.1 M NaF Fluoride standard, 475 mL
940907	100 ppm Fluoride standard, 475 mL
040908	10 ppm Fluoride standard premixed with TISAB II, color coded blue, 475 mL
040907	2 ppm Fluoride standard premixed with TISAB II, color coded red, 475 mL
040906	1 ppm Fluoride standard premixed with TISAB II, color coded green, 475 mL
940916	Fluoride standard bulk pack – 4 x 475 mL each of 1 ppm Fluoride standard premixed with TISAB II (040906) and 10 ppm Fluoride standard premixed with TISAB II (040908)
940909	TISAB II for Fluoride ISE, 1 gallon
940999	TISAB II for Fluoride ISE, 4 x 1 gallon
940911	TISAB III (concentrated) for Fluoride ISE, 475 mL
900061	Optimum results A fill solution for Fluoride electrode, 5 x 60 mL
Fluoroborate	
930711	Fluoroborate Ionic Strength Adjuster (ISA), 475 mL
Iodide	
945306	0.1 M NaI Iodide standard, 475 mL
940011	Iodide Ionic Strength Adjuster (ISA), 475 mL
900063	Optimum results D fill solution for Iodide electrode, 5 x 60 mL
Lead	
948206	0.1 M $Pb(ClO_4)_2$ Lead standard, 475 mL
900062	Optimum results B fill solution for Lead electrode, 5 x 60 mL
Nitrate	
920706	0.1 M $NaNO_3$ Nitrate standard, 475 mL
920707	1000 ppm Nitrate as Nitrogen (N) standard, 475 mL
930707	100 ppm Nitrate as Nitrogen (N) standard, 475 mL
930711	Nitrate Ionic Strength Adjuster (ISA), 475 mL
930710	Nitrate Interference Suppressor Solution (NISS), 475 mL
900046	Optimum results F fill solution for Nitrate electrode, 5 x 60 mL

Nitrate Test Kit	
700005 ⚠	Nitrate test kit for Ammonia ISE – 2 x 50 mL electrode fill solution (951203), 2 x 475 mL alkaline reagent (951011), 475 mL 100 ppm Nitrate as Nitrogen (N) standard (930707), 475 mL 100 ppm Ammonia as Nitrogen (N) standard (951207), 475 mL reducing reagent (700006) and 2 pipets
700006 ⚠	Nitrate test kit reducing reagent refill, 475 mL
951203	Nitrate test kit electrode fill solution, 50 mL
Nitrite	
954606	0.1 M $NaNO_2$ Nitrite standard, 475 mL
934610	Nitrite interference suppressor solution, 475 mL
900046	Optimum results F fill solution for Nitrite electrode, 5 x 60 mL
Nitrogen Oxide	
954606	0.1 M $NaNO_2$ Nitrogen Oxide standard, 475 mL
956410 ⚠	Nitrogen Oxide acid buffer, 475 mL
954602	Nitrogen Oxide electrode fill solution, 50 mL
Perchlorate	
930711	Perchlorate Ionic Strength Adjuster (ISA), 475 mL
Potassium	
921906	0.1 M KCl Potassium standard, 475 mL
931911	Potassium Ionic Strength Adjuster (ISA), 475 mL
900065	Optimum results E fill solution for Potassium electrode, 5 x 60 mL
Silver	
940011	Silver Ionic Strength Adjuster (ISA), 475 mL
900062	Optimum results B fill solution for Silver/Sulfide electrode, 5 x 60 mL
900067	Optimum results C fill solution for Silver electrode (when sample temperatures vary), 5 x 60 mL
Sodium	
941706	0.1 M NaCl Sodium standard, 475 mL
841108	1000 ppm Sodium standard, 475 mL
941107	100 ppm Sodium standard, 475 mL
941105	10 ppm Sodium standard, 475 mL
841111	Sodium Ionic Strength Adjuster (ISA), 475 mL
841113	Sodium electrode reconditioning solution, 475 mL
841101	Sodium electrode storage solution, 475 mL
650700	Sodium KAP analysis kit – 3 x 475 mL of 1 M NaCl with ISA and 475 mL of Sodium ISA (841111)
841109	Sodium KAP standard, 1000 ppm with ISA, 475 mL
900010	Sodium electrode fill solution, 5 x 60 mL
900012	Sodium electrode (low level) fill solution, 5 x 60 mL
900004	Sodium micro electrode fill solution, 5 x 60 mL



Sulfate	
948207	0.1 M Na_2SO_4 sulfate standard for lead electrode, 475 mL
Sulfide	
941609 ⚠	Sulfide SAOB reagent pack, 4 x 475 mL
900061	Optimum results A fill solution for Sulfide electrode (when sample temperatures vary), 5 x 60 mL
900062	Optimum results B fill solution for Silver/Sulfide electrode, 5 x 60 mL
Surfactant	
654202	0.01 M SLS Surfactant standard, 1 x 60 mL
654201	0.05 M hyamine Surfactant titrant, 475 mL
654205	Non-ionic Surfactant titrant, 475 mL
654203	Surfactant sample additive, tritonX-100, 475 mL
810007	Surfactant electrode fill solution, 5 x 60 mL
Thiocyanate	
940011	Thiocyanate Ionic Strength Adjuster (ISA), 475 mL
Water Hardness	
922006	0.1 M $CaCl_2$ Water Hardness standard, 475 mL
923206	100 ppm as $CaCO_3$ Water Hardness standard, 475 mL

⚠ Signifies a hazardous solution.
See terms and conditions for important shipping information at www.thermoscientific.com/water

ISE Accessories, Membranes and Modules

Cat. No.	Description
948201	Polishing strips for solid state electrodes
Ammonia, High Performance (9512HPBNWP, 9512HP01)	
951214	20 loose membranes
951215	3 pre-assembled bodies and membrane caps
Ammonia, Standard (9512BNWP, 951201)	
951204	20 loose membranes
951205	3 bonded membranes
Carbon Dioxide (9502BNWP)	
950204	4 membranes with o-rings
Nitrogen Oxide (9546BN)	
954604	20 loose membranes
950015	Spare electrode parts kit
97 Series Plastic Membrane Calcium, Nitrate and Potassium Combination Electrode Accessories	
9700BNWP	97 series electrode body with waterproof BNC connection
972001	Replacement module for calcium combination electrode (9720BNWP)
970701	Replacement module for nitrate combination electrode (9707BNWP)
971901	Replacement module for potassium combination electrode (9719BNWP)
93 Series Plastic Membrane Ammonium, Calcium, Chloride, Fluoroborate, HF Resistant pH, Nitrate, Perchlorate, Potassium and Water Hardness Half-Cell Electrode Accessories	
9300BNWP	93 series electrode body with waterproof BNC connection
930000	93 series electrode body with U.S. standard connection
9300SC	93 series electrode body with screw cap, separate cable required
900100	Single junction reference electrode with pin tip connection
900200	Double junction reference electrode with pin tip connection
931801	Replacement module for ammonium half-cell electrode
932001	Replacement module for calcium half-cell electrode (9320BN)
931701	Replacement module for chloride half-cell electrode
930501	Replacement module for fluoroborate half-cell electrode (9305BN)
930702	Replacement module for nitrate half-cell electrode (9307BNWP)
930701	Replacement modules (3) for nitrate half-cell electrode (9307BNWP)
938101	Replacement module for perchlorate half-cell electrode
930101	Replacement module for HF-resistant pH half-cell electrode
931901	Replacement module for potassium half-cell electrode (9319BN)
933201	Replacement module for water hardness half-cell electrode (9332BNWP)

Visit the WAI Online Library on **www.thermoscientific.com/water** for the most up-to-date MSDS and Certificate of Analysis files for Orion solutions.



Thermo Scientific Orion Conductivity Cells

Background/Theory

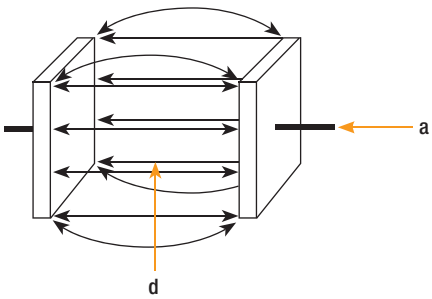
Electrical conductivity is an inherent property of most materials, and ranges from extremely conductive materials such as metals to non-conductive materials like plastic or glass. In between the two extremes are aqueous solutions, such as sea water and plating baths. In metals, the electrical current is carried by electrons while in water it is carried by charged ions. In both cases, the conductivity is determined by the number of charge carriers, how fast they move, and how much charge each one carries. Thus for most water solutions, the higher the concentration of dissolved salts, which will lead to more ions, the higher the conductivity. This effect continues until the solution gets too crowded, restricting the freedom of the ions to move and the conductivity may actually decrease with increasing concentration. This can result in two different concentrations of a salt having the same conductivity.

Conductance is defined as the reciprocal of resistance and is measured in Siemens (S), which was formerly referred to as mhos. Conductivity is an inherent property of any given solution and is derived from conductance by the geometry of the measuring cell. A measurement results in the conductance of the sample and it is converted to conductivity. This is done by measuring the cell constant (K) for each setup using a solution of known conductivity.

Cell conductance X Cell constant (K) = Conductivity

The Cell constant is related to the physical characteristics of the measuring cell. K is defined for 2 flat parallel measuring electrodes as the electrode separation distance (d) divided by the electrode area (a). In practice, the measured cell constant value is entered into the meter and the conversion from conductance to conductivity is done automatically.

$K = d/A = 1\ cm^{-1}$



Temperature

Temperature can have a substantial effect on conductivity. Raising the temperature makes water less viscous, and the ions can move faster. Because the ions are of different sizes, and carry different amounts of water with them as they move, the temperature effect is different for each ion. Typically the conductivity varies by 1-3 % per degree C.

Storage

Conductivity cells require minimal storage compared to other electrodes. They can be stored in deioinzed water in-between measurements. For storage overnight or longer, conductivity cells should be rinsed thoroughly in deionized water and stored dry.

Maintenance

Conductivity cells should be cleaned periodically to maintain maximum performance. If they become contaminated they should be cleaned. Refer to user guides for specific instructions for different electrode materials.

Contaminant	Cleaning Solution
Water soluble contaminants	Deionized water
Lubricants and oils	Warm water and liquid detergent or ethanol or acetone
Lime or hydroxide	10 % acetic acid or 10 % hydrochloric acid

Calibration

Cell constants at time of manufacture are listed on many conductivity cells. Calibration is essential since the cell constant can vary by 10 % or more from the nominal value and they do change over time. Once calibrated, they do not change quickly and do not require frequent calibration like a pH electrode. It is important to calibrate 25 ºC or know the value of your calibration standard at different temperatures. Thermo Scientific Orion conductivity standards have tables for actual values at different temperatures.

Benefits of Thermo Scientific Orion 2-Electrode Cells and 4-Electrode Cells

2-Electrode Cell Benefits	4- Electrode Cell Benefits
Available in glass, allows use in most samples	All have durable epoxy bodies
Best for ultra pure water measurements	No error from cable resistance, allowing for longer cable lengths
Multiple cell materials available, graphite, platinum or stainless steel	Minimum effect on accuracy from electrode polarization and contamination
Different cells designed to measure multiple specific ranges	Wide measurement range
Option for flow cell or flow-thru design	Unaffected by deposits on cell surface

Please visit **www.thermoscientific.com/waterlibrary** for more product information.

Thermo Scientific Orion Conductivity Cell Families

A wide range of conductivity cells are available for every application. These conductivity cells feature built-in temperature compensation; high, standard, and low conductivity measuring ranges; cell constants from 0.1 to 10 cm^{-1} and a variety of probe materials including epoxy/graphite, glass/platinum, and stainless steel.

DuraProbe™ 4-Electrode Conductivity Cells

DuraProbe 4-electrode cells provide the highest accuracy for demanding laboratory or field applications. The 4-electrode design compensates for electrode fouling, cable and connector resistance, polarization errors, and fringe field interference errors. The epoxy/graphite cell material is extremely durable and chemically resistant. DuraProbe conductivity cells are ideal for high and standard conductivity samples and difficult samples such as wastewater, runoff water, and mud.

2-Electrode Conductivity Cells

The 2-electrode cells are able to measure low, standard, and high conductivity samples, depending on the cell constant. Cells with a 0.1 cm^{-1} cell constant are ideal for low ionic strength solutions, deionized water, and ultra pure water. Glass/platinum cells are the best for chemically reactive conductivity samples, since the cell material is highly chemical resistant.

Rugged DuraProbe 4-electrode conductivity cell



013005MD [A]
013010MD [A]
013020MD [A]
013025MD [A]
013005A [F]
013010A [F]
013005D [B]

- Widest conductivity range
- For lab and field applications
- Rugged epoxy/graphite body
- Cable lengths from 1.5 to 10 meters

Reliable DuraProbe 4-electrode conductivity cell



013605MD [A]
013610MD [A]
013610 [F]

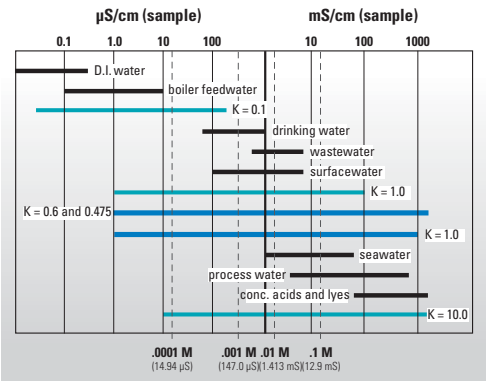
- Wide conductivity range
- For lab and field applications
- Rugged epoxy/graphite

2-electrode conductivity cell for ultra-pure water



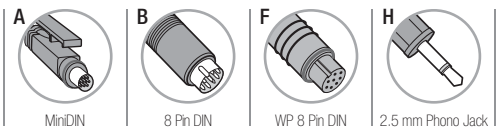
013016MD [A]
013016A [F]
013016D [B]

- Low conductivity range
- For ultra pure water applications
- Includes detachable glass flow cell



Cell Selection
Sample Conductivity Range

- Conventional 2-Electrode Cells
- Conventional 4-Electrode Cells



Key Information
A MiniDIN connector (Star) **B** 8 Pin DIN connector (A+ Series)
F 8 Pin Waterproof DIN connector (A Series)
H BNC and 2.5 mm Phono Jack connector (Russell)
*Conductivity cell does not have temperature compensation
**3-Electrode Conductivity Cell

Thermo Scientific Orion Conductivity Cell Families

Platinized 2-electrode conductivity cell



011020 [B]
011020A [F]

- Low conductivity range
- For ultra pure water applications
- Platinized glass/platinum

Chemical resistant 2-electrode conductivity cell



011010 [B]
011010A [F]

- Standard conductivity range
- For lab applications
- Chemical resistant glass body

Precise 2-electrode conductivity cell



011050MD [A]
011050 [B]

- Standard conductivity range
- For lab and field applications
- Platinized epoxy/platinum

Rugged 2-electrode conductivity cell



011510MD [A]
011510-WA [B]

- Standard conductivity range
- For lab and field applications
- Rugged epoxy/graphite

High range 2-electrode conductivity cell



018020MD [A] *

- High conductivity range
- For lab applications
- Chemical resistant glass body
- Flow through or dip cell

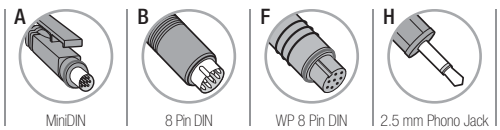
Chemical resistant 3-electrode conductivity cell



014005 [H] **

- Rugged epoxy/ stainless steel
- Removable guard

See page 104 for a full offering of conductivity cell accessories



Key Information
A MiniDIN connector (Star) **B** 8 Pin DIN connector (A+ Series)
F 8 Pin Waterproof DIN connector (A Series)
H BNC and 2.5 mm Phono Jack connector (Russell)
*Conductivity cell does not have temperature compensation
**3-Electrode Conductivity Cell



Thermo Scientific Orion Conductivity Cell Selection Guide

4-Electrode Conductivity Cells

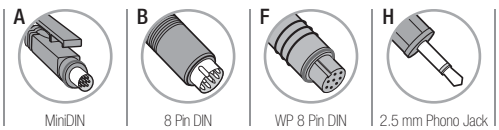
Cat. No.	Cable Length	Meter Compatibility	Measurement Range	Application	Approximate Cell Constant	Cell Material	Dimensions	Min/Max Immersion
013005MD [A]	1.5 m	Star Series	1 µS/cm to 200 mS/cm	Lab and field	0.475 cm^{-1}	Epoxy/ graphite	Dia - 15 mm Length - 120 mm	35/NA mm
013010MD [A]	3 m							
013020MD [A]	6 m							
013025MD [A]	10 m							
013605MD [A]	1.5 m	Star Series	10 µS/cm to 200 mS/cm	Lab and field	0.55 cm^{-1}	Epoxy/ graphite	Dia - 12 mm Length - 120 mm	35/NA mm
013610MD [A]	3 m							
013005A [F]	1.5 m	1230, 555A, 550A, 550, 162A, 162, 142, 136S, 135A, 131S,130A, 128	1 µS/cm to 200 mS/cm	Lab and field	0.475 cm^{-1}	Epoxy/ graphite	Dia - 15 mm Length - 120 mm	35/NA mm
013010A [F]	3 m							
013005D [B]	1.5 m	150 Aplus, 125 Aplus						
013610 [F]	3 m	555A, 550A, 162A, 136S, 135A, 131S, 130A	10 µS/cm to 200 mS/cm	Lab and field	0.55 cm^{-1}	Epoxy/ graphite	Dia - 12 mm Length - 120 mm	35/NA mm

3-Electrode Conductivity Cells

Cat. No.	Cable Length	Meter Compatibility	Measurement Range	Application	Approximate Cell Constant	Cell Material	Dimensions	Min/Max Immersion
014005 [H**]	1 m	RL060C Russell	0 µS/cm to 200 µS/cm	Field	1.0 cm^{-1}	Epoxy/steel	Dia - 13 mm Length - 120 mm	25/120 mm

2-Electrode Conductivity Cells

Cat. No.	Cable Length	Meter Compatibility	Measurement Range	Application	Approximate Cell Constant	Cell Material	Dimensions	Min/Max Immersion
013016MD [A]	1.5 m	Star Series	0.01 µS/cm to 300 µS/cm	Boiler feed water, ultra-pure water Includes flow cell	0.1 cm^{-1}	Steel, V4A	Dia - 13 mm Length - 120 mm Flow cell volume - 8-12 mL	35/110 mm
013016A [F]	1 m	555A, 550A, 162A, 136S, 135A, 131S, 130A						
013016D [B]	1 m	150Aplus, 145Aplus, 125Aplus, 115Aplus, 105Aplus						
011510MD [A]	3 m	Star Series	10 µS/cm to 200 mS/cm	Lab and Field	1.0 cm^{-1}	Epoxy/ graphite	Dia - 18 mm Length - 134 mm	35/NA mm
011510-WA [B]	3 m	150Aplus, 145Aplus, 125Aplus, 115Aplus, 105Aplus						
018020MD [A]	1.5 m	Star Series	10 µS/cm to 2000 mS/cm	High electrolyte concentrations, acids, lyes, industrial process water, sea water	10 cm^{-1}	Glass/ platinum, platinized	Dia - 16 mm Length - 115 mm	55/110 mm
011050MD [A]	1.5 m	Star Series	1 µS/cm to 20 mS/cm	Lab and Field	1.0 cm^{-1}	Epoxy/ platinum, platinized	Dia - 12 mm Length - 120 mm	20/90 mm
011050 [B]	1 m	150Aplus, 145Aplus, 125Aplus, 115Aplus, 05Aplus						
011020 [B]	1 m	150Aplus, 145Aplus, 125Aplus, 115Aplus, 05Aplus	0.1 µS/cm to 100 µS/cm	Boiler feed water, ultra-pure water	0.1 cm^{-1}	Glass/ platinum, platinized	Tip dia - 17 mm Tip length - 22 mm Dia - 13 mm Length - 120 mm	25/120 mm
011020A [F]	1 m	555A, 550A, 162A, 136S, 135A, 131S, 130A						
011010 [B]	1 m	150Aplus, 145Aplus, 125Aplus, 115Aplus, 05Aplus	1 µS/cm to 200 mS/cm	Lab	1.0 cm^{-1}	Glass/ platinum, platinized	Dia - 13 mm Length - 120 mm	25/120 mm
011010A [F]	1 m	555A, 550A, 162A, 136S, 135A, 131S, 130A						



Key Information
A MiniDIN connector (Star) **B** 8 Pin DIN connector (A+ Series)
F 8 Pin Waterproof DIN connector (A Series)
H BNC and 2.5 mm Phono Jack connector (Russell)
*Conductivity cell does not have temperature compensation
**3-Electrode Conductivity Cell

Thermo Scientific Orion Conductivity Standards and Accessories



Cat. No.	Description
011008	100 µS/cm conductivity/TDS standard, 5 x 60 mL
01100910	147 µS/cm conductivity standard, 10 pouches
011007	1413 µS/cm conductivity/TDS standard, 5 x 60 mL
01100710	1413 µS/cm conductivity/TDS standard, 10 pouches
011006	12.9 mS/cm conductivity/TDS standard, 5 x 60 mL
01100610	12.9 mS/cm conductivity/TDS standard, 10 pouches
011005	111.9 mS/cm conductivity standard, 5 x 60 mL
01100510	111.9 mS/cm conductivity standard, 10 pouches
990106	0.1 M KCl conductivity standard, 475 mL
011001	Conditioning solution for 011050, 011050A, and 011050MD conductivity cells
1010001	Conductivity calibration resistor kit for Orion Star and Orion Star A Series conductivity meters, MiniDIN
013017	Replacement flow cell for 013016A, 013016D, and 013016MD
080045	Stainless steel and plastic protective probe guard (for 013005MD, 013010MD, 013025MD, 013005A, 013010A, 013030A, 013060A, 013005D, 013010D)
081045	Plastic protective probe guard (for 013005MD, 013010MD, 013025MD, 013005A, 013010A, 013030A, 013060A, 013005D, 013010D)
090044	5 electrode holder (4 X 12 mm and 1 X 15 mm) to be used with 090043 electrode swing arm and 15 mm conductivity cells

Visit the WAI Online Library on **www.thermoscientific.com/water** for the most up-to-date MSDS and Certificate of Analysis files for Orion solutions.





Thermo Scientific Orion Dissolved Oxygen Probes

Dissolved Oxygen Background

Dissolved oxygen is often referred to as DO. It is a measure of the amount of oxygen in a solution. While some gases react chemically with water to form new compounds, gases like nitrogen and oxygen dissolve in water, without a chemical reaction and exist as microscopic bubbles between water molecules.

Air has a constant percentage of oxygen, approximately 20.9 %. When air comes in contact with water, the oxygen in air will dissolve in the water. There are a number of factors that determines how much oxygen dissolves in water:

- Is there sufficient time and adequate mixing to fully saturate the water
- Are substances present in the water that consume the oxygen
- **Water Temperature:** The solubility of oxygen reduces as temperature increases. Therefore the colder the water, the more dissolved oxygen it contains
- **Air Pressure:** As atmospheric pressure decreases with altitude, the amount of dissolved oxygen in water decreases
- **Salt Content:** The amount of dissolved oxygen increases as salinity decreases. Therefore freshwater holds more oxygen than saltwater

Membrane electrodes have been used for a many years to measure DO in water but optical DO probes are becoming more widely used as they offer a number of benefits to the user.

BOD Background

BOD (Biochemical Oxygen Demand) analysis is typically performed in wastewater plants. This analysis determines the amount of oxygen that microorganisms consume from water when they break down organic matter. The results of this analysis calculate the degree of water pollution and effectiveness of water treatment at wastewater or sewage plants. Properly treated wastewater will have a greatly reduced BOD value when being discharged from a treatment facility compared to when entering.

Calibration

Calibration of polarographic or RDO optical DO probes can quickly and easily be performed using the water-saturated air method. DO probes are placed in a moist calibration sleeve. Under equilibrium, the partial pressure of oxygen in air-saturated water is equal to the partial pressure of oxygen in water-saturated air. Therefore, a DO probe calibrated in water-saturated air will read the partial pressure of oxygen in water samples. For low concentration samples, a second calibration with a zero standard is recommended.

Storage

For storage of dissolved oxygen probes, they should be kept in a moist calibration sleeve. Polarographic probes should remain connected to the meter or it will need to be polarized again. For long term storage of polarographic probes, they should be disconnected from the meter, with the membrane cap removed and the sensor rinsed and kept dry.

Thermo Scientific Orion DO probes have calibration sleeves that can be used to protect the electrode between measurements as well as to perform calibrations. Protective guards are also available that will help protect the probe during field use and add weight to the probe to help submerge it when required.

RDO vs. Polarographic

Polarographic Do probes are often referred to as the Clark cell after it's' founder, Dr. Clark, and have been around for over 50 years. Polarographic probes require a voltage to operate from an external source such as your meter and require a polarization period before use. Optical dissolved oxygen is a newer method with some advantages over polarographic probes. There are a number of differences between the 2 measurements and you should evaluate your requirements when choosing which technology to use.

Differences Between Thermo Scientific Orion Polarographic DO and Optical DO

	Polarographic Probe	Optical Probe
Maintenance	Replace electrolyte and polish cathode ~ every 2 months. Clean probe as needed	Clean, probe, cap and optical window as needed
Storage	In moist calibration sleeve, long term, remove membrane cap and store dry	In moist calibration sleeve
Membrane	Change as needed, ~ every 2 months	Must be replaced every 365 days – do not use with solutions that contain organic solvents
Electrolyte	Change as needed, ~ every 2 months	None required
Warm-Time Required	Required if just connected to meter (30-60 minutes)	None required
Stirring	Required	Not necessary
Interferences	Ozone, sulfides, sulfur dioxide, nitrous oxide and carbon monoxide	Alcohols greater than 5 %, hydrogen peroxide greater than 3 %, sodium hypochlorite greater than 3 %, gaseous sulfur dioxide and gaseous chlorine

Please visit **www.thermoscientific.com/waterlibrary** for more product information.



Thermo Scientific Orion RDO Optical Dissolved Oxygen Probes

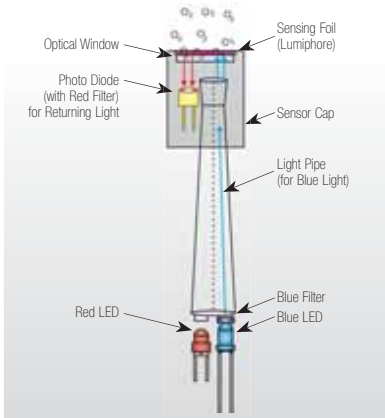
RDO technology meets the requirements of ASTM D888-05 Method C
Measuring dissolved oxygen with a luminescence-based sensor

Optical dissolved oxygen is a new technology with many advantages that is rapidly gaining acceptance.

The Thermo Scientific Orion RDO® probe provides reliable measurements, no warm up time, no stirring, no maintenance (membranes or solution), no thermal shock and less interferences. The sensor cap requires easy annual replacement. The optical sensor cap is durable, able to withstand harsh environments without degradation or effect on performance. The cap has minimal hydration effects and is not prone to photo bleaching. Calibration information is stored in the sensor cap enhancing the ease of use.

All Thermo Scientific RDO probes come with a stainless steel guard and calibration sleeve and are intended for field use.

Optical Sensor/Luminescense-Based Dissolved Oxygen Sensor



Optical Probe/Luminescense-based Dissolved Oxygen (LDO) – Newest technology that monitors time to quench an excited lumiphore, which is inversely proportional to the concentration of oxygen

Rugged, low maintenance field probe



BEST

No membranes to change
Sensor cap replaced annually

Cat. No.	087010MD	087020MD	087030MD	087050MD	087100MD
Description	Rugged dissolved oxygen probe with 3 meter cable	Rugged dissolved oxygen probe with 6 meter cable	Rugged dissolved oxygen probe with 10 meter cable	Rugged dissolved oxygen probe with 15 meter cable	Rugged dissolved oxygen probe with 30 meter cable
Accuracy	±0.1 mg/L from 0 to 8 mg/mL and ±0.2 mg/L from 8 to 20 mg/mL				
Response Time	T90, 30 seconds and T95, 60 seconds				
Operating Range	0 to 20 mg/L and 0 to 200 %				
Temperature Range	0 to 50 °C				

Cat. No.	Recommended Accessories
087001	Replacement RDO sensor cap
087002	Stainless steel protective guard, for RDO probe
087003	Calibration sleeve for RDO probe

For connector type information, refer to the RDO meter section to determine the correct meter for your application.

Thermo Scientific Orion Dissolved Oxygen Probe Families

A complete line of polarographic dissolved oxygen probes are available for BOD (Biochemical Oxygen Demand) analysis, beer and wine testing, rugged field applications, and water and wastewater analysis. All DO probes feature automatic temperature compensation and convenient screw on membrane caps that reduce probe servicing time and eliminate assembly problems.

The AUTO-STIR probe fits directly into a standard BOD bottle and has a built-in stirrer. This probe offers convenience, quick response, and long life between servicing.

See page 110 for a complete offering of accessories.

Durable and accurate DO probes for the lab or field



BEST

083005MD [A]
083010MD [A]
083025MD [A]
083060MD [A]

- For lab and field applications
- Cable lengths from 1.5 to 20 meters

AUTO-STIR™ probe for BOD applications



BEST

086030MD [A, C]
086020A [G]

- For lab applications
- Self-stirring with one-touch control

Reliable DO probes for the lab or field



BETTER

081010MD [A]

- For lab and field applications
- Rugged epoxy body

Rugged DO probes plus probe guard



BETTER

080510MD [A]

- For field applications
- Includes probe guard

Convert any pH meter into a DO meter



GOOD

970899WP [1]

- For lab applications
- Works on pH meters with BNC



Key Information
1 BNC Waterproof Connector
A MiniDIN Connector
C 3.5 mm Phono Tip Stirrer Jack Connector
G 13 Pin DIN Connector

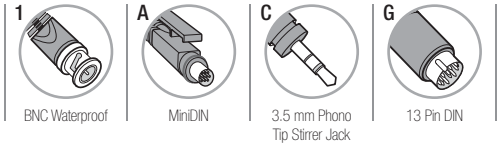


Thermo Scientific Orion Dissolved Oxygen Probe Selection Guide

Polarographic Dissolved Oxygen Probes

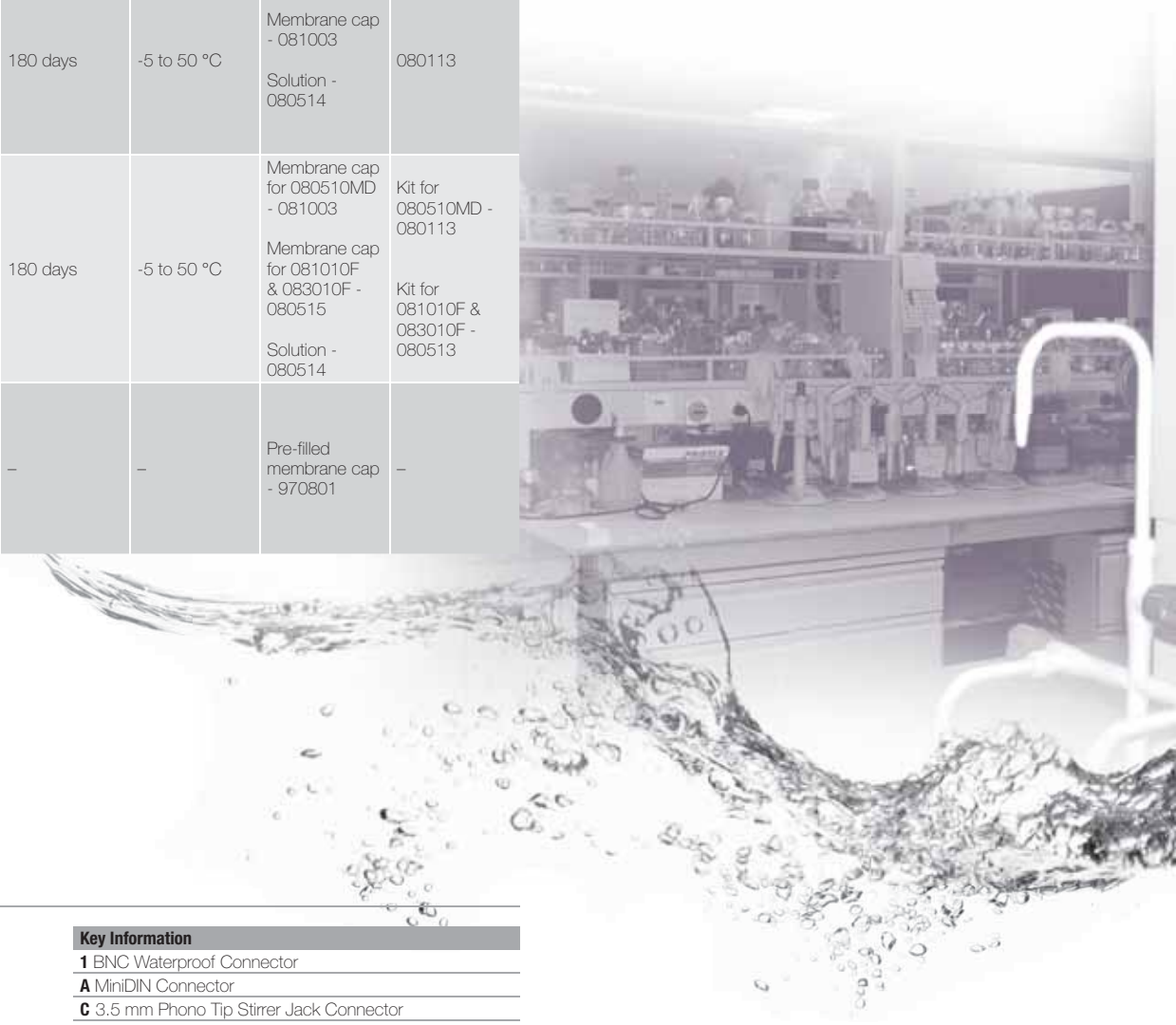
Cat. No.	Cable Length	Meter Compatibility	Application	Response Time	Minimum Sample Flow	Oxygen Consumption	Maximum Allowed Overpressure	Sample Temperature
083005MD [A]	1.5 m	Star series	Laboratory / field	90 % of final value in 10 seconds; 95 % of final value in 15 seconds; 99 % of final value in 60 seconds	10 cm/sec	0.008 µg/h $(mg/L)^{-1}$ at 20 °C	6 BAR	0 to 50 °C
083010MD [A]	3 m	Star series						
083025MD [A]	10 m	Star series						
083060MD [A]	20 m	Star series						
086020A [G]	2 m	862A	Laboratory	90 % of final value in 10 seconds; 95 % of final value in 15 seconds; 99 % of final value in 60 seconds	10 cm/sec	0.008 µg/h $(mg/L)^{-1}$ at 20 °C	6 BAR	0 to 50 °C
086030MD [A,C]	2 m	Star series, benchtop models						
081010MD [A]	3 m	Star Series	Laboratory / field	90 % of final value in 10 seconds; 95 % of final value in 16 seconds; 99 % of final value in 60 seconds	20 cm/sec	–	–	0 to 50 °C
080510MD [A]	3 m	Star Series	Field	90 % of final value in 10 seconds; 95 % of final value in 18 seconds; 99 % of final value in 60 seconds	10 cm/sec	0.008 µg/h $(mg/L)^{-1}$ at 20 °C	10 BAR	0 to 50 °C
970899WP [1*]	1 m	pH meters with BNC connector	Laboratory	96 % response in less than 30 seconds between oxygen-free and air saturated water at 22 °C	–	0.1 mg/hr	–	0 to 45 °C

*Accuracy – ±0.05 ppm or 2 % of reading, whichever is greater
Battery Life – One year based on 4 hours/day operation





Temperature Sensor	Drift	Electrolyte lifetime	Storage Temperature	Membrane Cap and Solution	Maintenance Kit
Dual, thermally separated	Approximately 0.1 % per day	180 days	-5 to 50 °C	Membrane cap - 080515 Solution - 080514	080513
Dual, thermally separated	Approximately 0.1 % per day	180 days	-5 to 50 °C	Membrane cap - 080515 Solution - 080514	080513
Single thermally separated	< 1 % per day	180 days	-5 to 50 °C	Membrane cap - 081003 Solution - 080514	080113
Dual, thermally separated (080510MD has a single temperature sensor)	Approximately 0.1 % per day	180 days	-5 to 50 °C	Membrane cap for 080510MD - 081003 Membrane cap for 081010F & 083010F - 080515 Solution - 080514	Kit for 080510MD - 080113 Kit for 081010F & 083010F - 080513
Dual, thermally separated	–	–	–	Pre-filled membrane cap - 970801	–



Key Information
1 BNC Waterproof Connector
A MiniDIN Connector
C 3.5 mm Phono Tip Stirrer Jack Connector
G 13 Pin DIN Connector

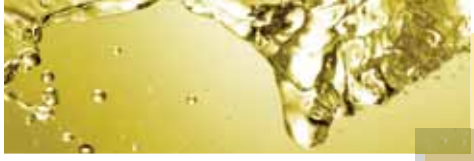
Polarographic Dissolved Oxygen Solutions and Accessories

Cat. No.	Description
087001	Replacement RDO optical cap
087002	Stainless steel protective probe guard for RDO probes
087003	Calibration sleeve for RDO probes
080513	Maintenance kit, includes electrolyte solution, polishing disk and 2 membrane caps for 083005MD, 083010MD, 083025MD, 083060MD, 086030MD, 083005A, 083010A, 083005D, 086020A, 081010F
080113	Maintenance kit, includes electrolyte solution, polishing disk and 2 membrane caps for 080510MD, 081010MD, 081010
080515	1 membrane cap for 083005MD, 083010MD, 083025MD, 083060MD, 086030MD, 083005A, 083010A, 083005D, 086020A, 081010F
081003	3 membrane caps for 080510MD, 081010MD, 081010
970801	1 pre-filled membrane cap for 970899WP, 970800
080514	Polarographic electrolyte solution for 083005MD, 083010MD, 083025MD, 083060MD, 086030MD, 083005A, 083010A, 083005D, 086020A, 081010F, 080510MD, 081010MD, 081010
080017	Calibration sleeve for all DO probes excluding AUTO-STIR probes and RDO probe
086021A	Calibration chamber/stand for 086020A, 086030MD AUTO-STIR probes
080360	BOD adapter for 083005MD, 083010MD, 083025MD, 083060MD, 083005A, 083010A, 083005D
080160	BOD adapter for 081010MD, 081010
970802	BOD stir funnel for 970899WP, 970800
970803	2 batteries for 970899WP, 970800
080045	Stainless steel and plastic protective probe guard for 080510MD, 083005MD, 083010MD, 083025MD, 083060MD, 083005A, 083005D, 083010A
081045	Plastic protective probe guard for 080510MD, 083005MD, 083010MD, 083025MD, 083060MD, 083005A, 083005D, 083010A

Visit the WAI Online Library on **www.thermoscientific.com/water** for the most up-to-date MSDS and Certificate of Analysis files for Orion solutions.







Colorimetry and Turbidity – The Optical Measurements

Colorimeters and Turbidity meters both employ optical measurements. Optical measurements use light to quantify the amount of a colored or cloudy sample. Colorimeters are used to measure the concentration of a sample component. Turbidity meters can determine how cloudy the sample is and report a number value for the turbidity.

Colorimetic measurements use a small light source to pass a narrow band of light straight through a reacted test sample in a vial. The light beam exiting the sample vial is collected in a detector at 180 degrees from the initial beam. The detector reading that was measured is converted to a concentration for that specific test. Some single parameter colorimeters have only one measurement performed. Multi-parameter meters require the user to select the appropriate method number to match the test and reagent type being used.

These tests allow you to expand your testing capabilities for species that are not detectable by pH, DO, Conductivity and Ion Selective Electrode (ISE) electrochemical methods. Colorimeters require the use of a reagent in most cases. The reagent will react with the targeted component of the sample. The user can then measure the reacted sample in their colorimeter to determine the concentration of the component in that sample. The sample result is compared to a programmed calibration curve in the meter of reacted, known standard values. The colorimeter measurement can be seen on the display.

Globally, there are many regulations that are in place to ensure our drinking water is safe to drink and our wastewater will not alter or destroy our local ecosystems and oceans. Regulations vary due to the sample components in the area. A disinfectant, used to purify water, is commonly tested by colorimetry. In groundwater that is the source of a drinking water supply, there could be underground iron deposits creating a tint of color to the water. The water may be checked for iron level and also the chemical form of that iron. Water components present that increase maintenance frequency may also be tested regularly to monitor and maximize time online.

Many test reagents are available for measuring parameters that are reported as required on regulatory compliance permits.

Turbidity is a measurement of "cloudiness" or particulates floating in the sample. The more particles present, the higher the sample's turbidity. Low turbidity sample particles can often not be seen. An instrument is needed to quantify the turbidity present. Turbidity meters require standards to calibrate the meter periodically and to check the calibration by a read-back of the standards. Orion AQ4500 Method is approved for Drinking Water and Wastewater reporting and also satisfies the ISO 7027 measurement reporting with our ISO Nephelometric mode.

Visit our online library at **www.thermoscientific.com/WAI-Library** to review the colorimetry and turbidity approvals. You will find our newly approved Orion AQ4500 Drinking Water and Wastewater turbidity methods. Our ISO 7027 method being used around the world. We have posted many application notes and briefs to assist you with your testing.



Please visit **www.thermoscientific.com/waterlibrary** for more product information.



Thermo Scientific Orion Colorimetry and Turbidity Markets

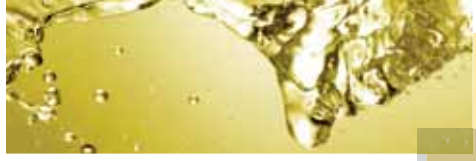
You can find colorimetry and turbidity measurements in a wide variety of industries. The tests are quick and easy and often cost less than alternative methods. Thermo Scientific Orion colorimetry and turbidity products have approvals and meet the regulatory requirements in many industries. We also have several types of tests for common parameters to give you choices of reagent types, ranges and simplicity to fit your requirements. The reagent table on pages 120 and 121 highlights our EPA approved, accepted and equivalent methods.

Commonly Tested Parameters by Market

Agriculture	Beverage	Drinking Water	Environ-mental	Wastewater	Aquaculture	Boiler/ Cooling Water	Chemical
Ammonia	Bromine	Aluminum	Ammonia	Aluminum	Ammonia	Aluminum	Aluminum
Chlorine	Chlorine	Ammonia	Bromine	Ammonia	Bromine	Ammonia	Ammonia
Iron	Chlorine Dioxide	Bromine	Chlorine	Bromine	Chlorine	Bromine	Copper
Nitrate	Copper	Chloride	COD	Chlorine	Copper	Chlorine	Iron
Nitrite	Fluoride	Chlorine	Copper	COD	Nitrate	Chlorine dioxide	Nitrate
Oxygen	Iron	Chlorine Dioxide	Iron	Copper	Nitrite	Copper	Nitrite
pH	Manganese	Copper	Nitrate	Iron	Oxygen	Hydrazine	pH
Phosphate	Nitrate	Fluoride	Nitrite	Manganese	Ozone	Iron	Phosphate
Silica	Oxygen	Iron	Ozone	Nitrate	pH	Nitrate	Silica
Sulfate	pH	Manganese	pH	Nitrite	Phosphate	Nitrite	Sulfate
Turbidity	Phosphate	Nitrate	Silica	Oxygen	Turbidity	Ozone	Sulfide
	Silica	Nitrite	Sulfate	Ozone		Oxygen	Zinc
	Turbidity	pH	Sulfide	pH		Phosphate	
		Phosphate	Zinc	Phosphate		pH	
		Ozone		Sulfate		Silica	
		Silica		Sulfide		Zinc	
		Sulfate		Zinc			
		Sulfide		Turbidity			
		Zinc					
		Turbidity					

Metal Plating	Mining	Pulp & Paper	Solid Waste/ Sludge	Petroleum	Pharma-ceutical/ Biotech	Semi-conductor
Copper	Copper	Aluminum	Aluminum	Ammonia	Chlorine	Aluminum
Iron	Cyanide	Chlorine	Copper	Chlorine	Cyanide	Copper
pH	Iron	Chlorine dioxide	Nitrate	Iron	Ozone	Fluoride
Phosphate	pH	pH	Nitrite	Nitrate	pH	pH
	Phosphate	Phosphate	pH	pH	Silica	Silica
	Zinc	Silica	Phosphate	Sulfide		
		Zinc	Zinc			





Thermo Scientific Orion AQ3700 Colorimeter

Featuring digestion tests for nitrogen, phosphate and COD



The Orion AQ3700 is the newest addition to the colorimetry line. With over 70 pre-programmed method options, this IP67 waterproof portable meter offers liquid, powder and tablet tests for expanded ranges and test options. There are six wavelengths generated by the long life LEDs in the meter. This instrument has a graphical display that is easy to understand and can be used in English, Spanish, German, French, Italian, or Polish.

See pages 118-121 for additional AQ3700 reagents.

Specifications	Description
Incident Light Source	6 light emitting diodes (LED)
Wavelengths	430, 530, 560, 580, 610, 660 nm
Photometric Precision	2 % full scale as measured with standard solutions
Photometric Resolution	±0.005 Abs
Software	
Test Methods	Preprogrammed with user prompts and feedback, efficient user's favorite list
Autoranging	Yes
Blank Capability	Per method
Test Reagent Formats	Powder, tablet, liquid, reagent reaction tubes, acid digestion tubes
Datalog Points	Up to 1000, time and date stamp
New Method Upload Capability	Yes, via internal RJ45 port
Meter Hardware	
Display	Backlit, graphic display
Inputs	12 button numeric keypad, plus 3 function keys
Sample Required	10 mL
Sample Cells Accepted	24 mm sample vials; 13 mm ampoules and 16 mm tubes with included adapters
Outputs	IRDA (adapter required)
Auto Shut Down	20 min after last key-press, wakes to last location
Power	4 AA batteries (>3000 tests)
Regulatory and Safety	CE, FCC part 15
Environmental Conditions	5 to 40 °C (30 to 90 % non-condensing at 30 °C)
Meter Waterproof Rating	IP67
Warranty	2 years

New Reagents for AQ3700

Cat. No.	New Test	Range, mg/L	Reagent Type
AC2002	Alkalinity-m/ Acid Demand pH 4.3	5 to 200/ 0.1-4 mmol/L	Tablet
AC3002P	Alkalinity-p	5 to 500	Tablet
AC4P27	Aluminum, LR	0.01 to 0.25	Tablet & liquid
ACR012	Ammonia, LR	0.02 to 2.5	Powder & reaction tube
ACR011	Ammonia, HR	1 to 50	Powder & reaction tube
AC3072	Chlorine total HR/ Sodium Hypochlorite	5 to 200/ 0.2 to 16 % NaOCl	Tablet
AC3032C	Hardness, Calcium	50 to 900	Tablet
AC3032C2	Hardness, Calcium 2 LR	0 to 500	Tablet
AC3032T	Hardness, total	2 to 50	Tablet
AC4P54	Manganese, LR	0.01 to 0.7	Powder & liquid
ACR007	Nitrate	1.0 to 30.0	Powder pack & reaction tube
AC4P46	Nitrite	0.01 to 0.3	Powder pack
ACD004	Nitrogen, total, LR	0.5 to 25	Powder pack & digestion tube
ACD007	Nitrogen, total, HR	5 to 150	Powder pack & digestion tube
ACR095	Phosphate, ortho	0.06 to 5	Powder pack & reaction tube
ACD095AH	Phosphate, acid hydrolyzable	0.02 to 1.6	Powder pack & digestion tube
ACD095	Phosphate, total	0.02 to 1.1	Powder pack & digestion tube
AC3001TB	pH	8.0 to 9.6	Tablet
AC3072	Sodium hypochlorite	0.2 to 16 % NaOCl	Tablet

Ordering Information

Cat. No.	Description
AQ3700	Meter kit includes AQ3700 meter, 4 batteries, 4 vials (24 mm), 3 vials (16 mm), 1 adapter each for 16 mm and 13 mm vials, carrying case, user guide with test methods, tablet tampering stir rod and brush. **Order reagents and IR adapter separately.**

Accessories for AQ3700 Meter

Cat. No.	Description
AC2V16	Replacement 16 mm vials, package of 10
AC2V24	Replacement 24 mm vials, package of 12
AC37A16	Replacement 16 mm adapter for AQ3700
AC37A13	Replacement 13 mm adapter for AQ3700
AC3ROD	Stir rod, package of 10
AC3CBR	Cleaning brush, package of 5
AC3VSK	Meter verification check standards kit
AQ37IRIM	IR data transfer interface module

Many of our long-standing colorimetry tablet and powder reagents as well as COD tests are already programmed into the AQ3700. See pages 118-121 for additional test parameters, meter accessories, digestion supplies, and more reagent options.



Thermo Scientific Orion AQ4000 Colorimeter

The most advanced microprocessor-based LED colorimeter on the market today!

The AQ4000 colorimeter stores up to 189 pre-programmed methods and can record 100 data points in the field with a time and date stamp. Download later to a printer or computer in the lab.

The AQ4000 colorimeter takes all the guesswork out of sample preparation with the Auto-Test™ ampoules and the exclusive Auto-ID™ feature.

Quality of the measurement is assured since the ampoules are only opened when a measurement is about to be taken.

- **Auto-ID:** Automatically identifies the species to be measured, selects the method and the wavelength plus initiates the method – no buttons to push!
- **Auto-Test Ampoules:** Pre-measured liquid reagent ampoules are specially designed to work with the AQ4000

Selection of Display Units is Push-Button Easy

Choose from concentration, absorbance or percent transmittance. The AQ4000 accepts round vials with diameters of 13, 16 or 24 mm. Best of all, the AQ4000 carries a full two year warranty.

Use the AQ4000 with Our Tablets or Powders

- **Tablets:** Quick dissolve tablets that are easy to add to the sample. Tablets can be used with the AQUAfast II series and AQ4000 colorimeters.
- **Powders:** Pre-measured and ready-to-use packets. Just add the packet to the sample, allow it to dissolve and then take your measurement. Many reagents meet regulatory requirements.
- **COD Reagents:** Available in three measurement ranges – low, mid and high range.

Updating the AQ4000 with New Methods is Simple

The latest software updates are available at **www.thermoscientific.com/water**. A simple download procedure updates the colorimeter with the most current programs in a few quick, easy steps.

See pages 120 and 121 for reagent chemistries that you can use with the AQ4000 colorimeter.

AQ4000 Colorimeter and Accessories

Cat. No.	Description
AQ4000	Orion IV colorimeter only (order reagents separately)
AQ40FK	Replacement field case to carry AQ4000 meter, accessories and reagents
AQ4EK1 ⚠	Choice clean water kit featuring the AQ4000
AQ4CBL	RS232 cable for data download and software updates
AQ4ZER	AQUAfast zero kit
AC2V16	16 mm vials, 10 pack
AC2V24	24 mm vials, 12 pack

AQII Series Accessories

Cat. No.	Description
AC2V16	16 mm replacement vials, 10 pack
AC2V24	24 mm replacement vials, 12 pack
AC2T24	24 mm replacement turbidity vials, 12 pack
AC2073 ⚠	Chlorine secondary reference standards kit for AQ2070
AC201S	Turbidity standards for AQ2010

⚠ Signifies a hazardous solution.
See terms and conditions for important shipping information at www.thermoscientific.com/water

Easily create and store your own calibration curve for up to 10 new tests in the meter.



Versatile AQ4000 Meter

Thermo Scientific Orion AQ3070 Chlorine Meter

Measures free and total chlorine for EPA reporting – and more!



AQ3070 Meter



AQ3070 Meter Kit

Specifications	Description
Display	LCD
Keys	Power, mode, zero, read/enter
Sample Requirement	10 mL
Light Shield Cover Over Vial for Measuring	Not needed
Power with Auto Shutoff	4 x AAA, >3000 tests
Regulatory Approvals	CE, TUV for US and Canada, FCC part 15
Warranty	2 years
Operating Range	0 to 50 ºC, 0 to 90 % relative humidity, non-condensing at 30 ºC
Test Parameter Ranges	
Free Chlorine	0.02 to 4.0 mg/L; US EPA range 0.03 to 2.0 mg/L
Total Chlorine	0.02 to 4.0 mg/L; US EPA range 0.03 to 2.0 mg/L
Chlorine Dioxide	0 to 11.4 mg/L
pH	5.9 to 8.2 pH
Cyanuric Acid	5 to 90 mg/L

- EPA-approved AC4P71 free chlorine and AC4P72 total chlorine methods for drinking water and wastewater
- Single meter programmed for free chlorine, total chlorine, pH, chlorine dioxide and cyanuric acid measurements
- Additional capability for liquid pH test, chlorine dioxide and cyanuric acid – no need to purchase separate meters for additional tests
- Chlorine dioxide and cyanuric acid tablets feature long shelf lives, so they are ready when you need them

Designed with the user in mind, these small rugged IP67 portable meters have a large easy-to-read display with a very simple user interface. The expanded range for free and total chlorine measurements gives you a real number if you are out of the EPA measurement range to quickly recover your process. The results are accurate and repeatable. You save time while measuring by not having to cover and uncover the vial for each measurement. The field case keeps the meter and test supplies always ready for testing.

Visit www.thermoscientific.com/WAI-Library for our EPA letters and methods.

Ordering Information

Cat. No.	Description	Contents
AQ3070	Orion III chlorine meter kit	Meter, 6 sample vials, AC4P71 free chlorine, AC4P72 total chlorine, batteries, vial cleaning brush, tablet tamping stir rod, user guide, MSDSs, and carrying case
AC4P71	AQUAfast AC4P71 free chlorine powder packets	100 tests
AC4P72	AQUAfast AC4P72 total chlorine powder packets	100 tests
AC2099	Chlorine dioxide tablets	100 tests
AC3001	pH, 2 x 15 mL dropper bottles	60 tests
AC2098	Cyanuric acid, tablets	100 tests
AC3V25	Replacement 25 mm vials, pack of 3	3 vials
AC3ROD	Replacement tablet tamping stir rod	1 package of 10
AC3CBR	Replacement vial cleaning brush	1 package of 5

Thermo Scientific Orion AQ4500 Turbidity Meter

The AQ4500 features both White and Infrared light sources – so this is the only meter you need for all of your turbidity testing.

The AQ4500 turbidimeter has dual source LED that allows readings that comply with reporting requirements for both EPA and ISO 7027 methodologies.

- Nephelometric and ratiometric measurements with autoranging
- IR mode options for measurement of wines and colored samples
- Data log capacity of up to 100 data points
- Reading ranges vary from 0 to 4000 with appropriate units based on test selected
- Includes turbidity standards kit, rugged carrying case, and replacement vials
- The AQ4500 is truly IP67 waterproof to a depth of 3 meters

For drinking water, our Orion AQ4500 Method has been approved for regulatory reporting and is published in the US Federal Register.

For wastewater, our Orion AQ4500 Method has been approved for regulatory reporting and is published in the US Federal Register.

Methods are available at www.thermofisher.com/WAI-Library.

The IR based methods meet ISO 7027 requirements. Review the measurement information in the user guide to determine the method needed.





AQ4500 Kit

Specifications

Specifications	Description
Light Source	White LED, IR LED
Temperature Effect	LED temperature compensated
Includes Measurement Modes	EPA 180.1, ISO nephelometric, ISO absorbance, IR ratiometric, % transmittance, EPA GLI method 2, EBC (European Brewing Chemists), ASBC (American Society of Brewing Chemists)
Measurement Ranges	0 to 4000 NTU, EPA 0 to 2000 NTU, GLI range 0 to 40 NTU, ISO-7027 0 to 150 FAU, IR Ratio 0 to 4000 NTU, EBC 0 to 24.5, ASBC 0 to 236
Resolution	0.01 (0 to 9.99 NTU), 0.1 (10 to 99.9), 1 (100 to 1000)
Precision	±2 % of reading plus 0.01 NTU from 0 to 500 NTU, ±3 % of reading from 500 to 100 NTU, ±5 % of reading from 1000 to 2000 NTU
Calibration Standards	Provided primary SDVB standards
Sample Size Minimum	10 mL
User Interface	Automatic sample measurement for each measurement with simple user interface
RS232	Bidirectional
Datalog	100 points
Real Time Clock	Yes
Power	Long life – low power consumption – about 2500 hours with 4 alkaline AA batteries or about 10000 with lithium batteries
Waterproof Rating	IP67
Warranty	2 years
Regulatory and Safety	CE, FCC part 15
Operating Temperatures	(-40 °C to 60 °C), 90 % relative humidity at 30.0 °C max

Ordering Information

Cat. No.	Description
AQ4500	Orion AQ4500 turbidimeter and calibration kit. Kit includes meter, 4 primary standards, standard and sample vials, silicone oil and cloth in carrying case
AQ4CBL	RS232 cable for data download and software updates
AC45FZ	Formazin turbidity standard, 4000 NTU, 475 mL
AC45S1	Silicon oil and cloth kit for AQ4500
AC45ST	Primary turbidity calibration kit for AQ4500 meter only, replacement
AC2T24	24 mm replacement turbidity only vials, 12 pack

Thermo Scientific Orion AQ3010 Turbidity Meter



AQ3010 Meter Kit

- Ergonomic IP67 turbidity meter for lab or field use
- Uses Nephelometric principle with 90 º detection
- In most locations a separate light cap or shield is not needed
- Meets ISO 7027 and offers consistent light source for greater accuracy
- Easy vial indexing with continuous measurement mode
- No mixing or diluting with polymer bead primary standards for faster calibration
- Three year warranty

The Orion AQ3010 Turbidity Meter makes it easy to determine the clarity of your sample with one keystroke and without an extra light shield cap in many environments. With autoranging from 0 - 1000 NTUs, this small waterproof portable meter is very easy to use, plus features a large easy-to-read LCD display. The meter is supplied with ready-to-use, highly stable EPA-approved and ISO accepted polymer bead primary standards. Calibration is easy with step-by-step prompts with the option to choose which points to calibrate. The standards can be used for a calibration check at any time, verifying that your readings are accurate.

The Orion AQ3010 meter comes with everything you need in a field case for easy storage and transport. This meter is covered by a 3 year warranty!

Make your job easier!
Visit our new applications webpage at http://www.thermoscientific.com/waterapps for regulatory links, methods, applications and technical information.

Specifications

Specifications	Description
Display	LCD
Keys	Power, cal, scroll up, scroll down, read/enter
Automatic Range Selections and Resolution	0.01 to 19.99 NTU with 0.01 NTU resolution
	20.0 to 99.9 NTU with 0.1 NTU resolution
	100-1000 NTU with 1 NTU resolution
Precision	±2 % of reading ±1 LSD for 0-500 NTU
	±3 % of reading ±1 LSD for 501-1000 NTU
Response Time	<6 seconds
Sample Requirement	10 mL
Included Calibration Standards	0.02, 20.0, 100, and 800 NTU
Sample Vials	25 mm diameter with indexing mark
Light Source	IR LED for ISO 7027 turbidity measurement
Power	4 x AAA >3000 tests (4 x AAA lithium >12000 tests)
Battery Conservation Feature	Auto shutoff after 20 minutes of inactivity
Ambient Operating Temperature	0 to 50 ºC (0 to 90 % non-condensing relative humidity at 30 ºC)
Self Diagnostics	Yes, with troubleshooting error codes
Waterproof Rating	IP67
Regulatory Approvals	CE, TUV 3-in-1 for CSA-US, FCC part 15
Warranty	3 year

Ordering Information

Cat. No.	Description	Contents
AQ3010	Orion turbidity meter kit	Meter, set of EPA-approved polymer-based primary turbidity standards, batteries, light shield cover, seven vials, lint-free cloth, silicone oil, MSDS and user guide
AC301S	Replacement set of EPA-approved and ISO accepted polymer-based primary turbidity standards	60 mL bottle of 0.02, 20.0, 100, and 800 NTU
AC3SIL	Replacement silicone oil and cloth	1 bottle of silicone oil and one cloth
AC3V25	Replacement 25 mm vials, pack of 3	3 empty 25 mm vials with caps
AC3CBR	Replacement vial cleaning brush	Brush, package of 5

Thermo Scientific Orion COD Test Systems

COD testing correlated to BOD readings can save time and money



AQ4000 Meter

The AQ4000 and AQ3700 colorimeters support additional tests, including chlorine, nitrite and ammonia (see pages 119-121).

- Ideal for environmental and wastewater monitoring with EPA accepted methods
- Three ranges of COD reagents
- COD reactor can digest up to 25 samples simultaneously in 2 hours or less and meet fast COD temperature requirements
- Works with the new AQ3700 multiparameter colorimeter, the AQ4000 advanced colorimeter or the economical AQ2040 colorimeter kit

Just add the sample to the COD vial, digest sample in the reactor and read results with your Orion colorimeter.



COD Reactor,
Test Reagents and Standards
with AQ4000 Meter

The AQ4000 and AQ3700 Colorimeters Offer:

- Pre-programmed methods for water quality testing
- Multiple wavelength and more test options
- Datalogging and GLP features
- Bidirectional RS232 interface on AQ4000
- IR Interface on AQ3700 (IRDA required)
- Compatibility with 13, 16 and 24 mm diameter vials
- IP67 waterproof housing
- 2 year warranty

The AQ2040 Colorimeter Offers:

- Low-cost, dedicated colorimeter design for COD testing
- Measures all three COD ranges
- 1 year warranty

Please visit www.thermoscientific.com/water for more product, methods information and method approval letters from EPA.

Select One Meter

Cat. No.	Description
AQ4000	Orion AQ4000 advanced colorimeter with COD
AQ2040	Orion II dedicated COD meter
AQ3700	Orion AQ3700 colorimeter with COD, total nitrogen and total phosphate

Order Digestor

Cat. No.	Description
COD165	Orion thermoreactor for digestion methods to 165 °C

Select Your Test Reagents by Range and Quantity

Cat. No.	Range	No. of Vials	EPA Approved
CODL00	0 to 150 ppm	25	Yes
CODH00	0 to 1500 ppm	25	Yes
CODHP0	0 to 15000 ppm	25	No requirement

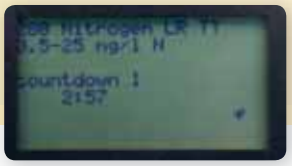
Select a Standard

Cat. No.	Description
CODS01	AQUAfast 1000 ppm COD standard, 475 mL
CODS10	AQUAfast 10000 ppm COD standard, 475 mL

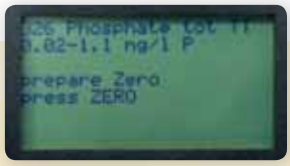
Thermo Scientific Orion Digestion Test Reagents



Orion AQ3700 Meter



Total Nitrogen LR Test



Total Phosphate Test

Tube Digestions for Nitrogen and Phosphate Nutrient Removal Process Monitoring

The benefit of efficient operation is important to all production facilities, no matter what they make. By optimizing the process in wastewater treatment, the dirty water can move to the next stage of the process at the perfect time – not prior to the being fully treated and not overtreated. Overtreatment wastes chemicals and slows down the processing. Undertreatment can cause problems if the discharge does not meet the permit levels. Typically total nitrogen and total phosphate and other digestions were very long reflux processes with expensive glassware. Now the results can be ready in an hour or so using persulfate digestion tube methods. This greatly improves the turnaround time for the results. These in process checks of the nutrient removal status can ensure you are on track for the final levels you need to attain or give you timely information to correct the process.

With the AQ3700 meter, total nitrogen and total phosphate tube digestion tests are now available. The kit includes the reagents and accessories for the test.

If you are already testing COD levels, you can quickly add these important tests and start reaping the benefits!

Overview of Nitrogen and Phosphorus Methods

- Persulfate digestion for nitrogen; persulfate/ascorbic acid digestion for phosphorus
- Nitrogen tests require two tubes – one for a blank and one for the test; phosphate test needs just one tube for the blank and test
- 100 ºC digestion temperature for 30 minutes and let cool about 10 more minutes for additional reagent reaction times
- Orion COD 165 digestor has the temperatures needed for nitrogen and phosphate tests, see page 118

Nitrogen

Cat. No.	Description	Quantity
ACD004	Total nitrogen LR reagents (0.5 to 25 mg/L)	50 tests
ACD007	Total nitrogen HR reagents (5 to 150 mg/L)	50 tests

Phosphate

Cat. No.	Description	Quantity
ACD095	Total phosphorous reagents (0.02 to 1.1 mg/L)	50 tests

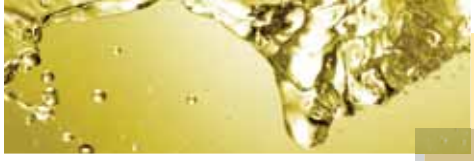
Thermo Scientific Orion AQUAfast Colorimeter Reagent Chemistries



Colour Codes

Tablet | Liquid | Powder | Auto-Test Ampoule

Parameter	Reagent Type	Catalog Number	Description	Range	Method	Number of Tests	Meter Models	EPA Approved Methods
Alkalinity-m	Tablet	AC2002	AQUAfast II alkalinity-m	5.0 - 200 mg/L	Acid/indicator	100	AQ4000, AQ3700, AQ2001	–
Aluminum	Auto-Test Ampoule	AC4027	AQUAfast IV aluminum	0.04 - 0.25 mg/L	Eriochrome cyanine R	30	AQ4000	WW equivalent
	Tablet	AC2027	AQUAfast II aluminum	0.05 - 0.30 mg/L	Eriochrome cyanine R	50	AQ4000, AQ3700, AQ2005, AQ2020	WW equivalent
Ammonia (Nitrogen)	Powder	AC4P12	AQUAfast ammonia-nitrogen, powder	0.1 - 0.50 mg/L	Salicylate	100	AQ4000, AQ3700	–
	Auto-Test Ampoule	AC4010	AQUAfast IV ammonia (ultra low range)	0.10 - 3.0 mg/L	Salicylate	30	AQ4000	–
	Auto-Test Ampoule	AC4012	AQUAfast IV ammonia (low range)	0.5 - 7.0 mg/L	Nesslerization	30	AQ4000	WW equivalent
	Auto-Test Ampoule	AC4011	AQUAfast IV ammonia (high range)	1.0 - 14 mg/L	Nesslerization	30	AQ4000	WW equivalent
	Tablet	AC2012	AQUAfast II ammonia, as nitrogen	0.05 - 1.0 mg/L; 0.5 - 10.0 mg/L	Indophenole/phenate	50	AQ4000, AQ3700, AQ2004	WW equivalent
Bromine	Tablet	AC2035	AQUAfast II bromine	0.1 - 13.5 mg/L	DDPD	100	AQ3700, AQ2005	No requirement
Chloride	Auto-Test Ampoule	AC4017	AQUAfast IV chloride	2.0 - 40 mg/L	Mercuric nitrate	30	AQ4000	–
	Tablet	AC2017	AQUAfast II chloride	0.5 - 25 mg/L	Silver nitrate/turbidity	50	AQ4000, AQ3700, AQ2005	–
Chlorine Dioxide	Auto-Test Ampoule	AC4099	AQUAfast IV chlorine dioxide	0.80 - 12 mg/L	DPD	30	AQ4000	No requirement
	Tablet	AC2099	AQUAfast II chlorine dioxide	0.04 - 2.8 mg/L	DPD	100	AQ4000, AQ3070, AQ3700, AQ2020	No requirement
Chlorine	Powder	AC4P71	AQUAfast chlorine, free, DPD, powder packets, EPA-approved method	0.03 - 2.00 mg/L	DPD	100	AQ4000, AQ3070, AQ3700	DW
	Powder	AC4P71B	AQUAfast chlorine, free, powder packets bulk packaging, EPA-approved method	0.03 - 2.00 mg/L	DPD	1000	AQ4000, AQ3070, AQ3700	DW
	Tablet	AC2071	AQUAfast II chlorine, DPD, free only	0.05 - 6.0 mg/L	DPD	100	AQ4000, AQ2070, AQ3700	–
	Auto-Test Ampoule	AC4070	AQUAfast IV chlorine, free and total, EPA-approved method	0.05 - 6.0 mg/L	DPD	30	AQ4000	DW
	Tablet	AC2070	AQUAfast II chlorine, free and total	0.05 - 6.0 mg/L	DPD	50 each	AQ4000, AQ3700, AQ2070, AQ2020	–
	Powder	AC4P72	AQUAfast chlorine, total, DPD, powder packets, EPA-approved method	0.03 - 2.00 mg/L	DPD	100	AQ4000, AQ3070, AQ3700	DW & WW
	Powder	AC4P72B	AQUAfast chlorine, total, powder packets bulk packaging, EPA-approved method	0.03 - 2.00 mg/L	DPD	1000	AQ4000, AQ3070, AQ3700	DW & WW
	Tablet	AC2072	AQUAfast II chlorine, total, EPA-approved method	0.05 - 6.0 mg/L	DPD	50	AQ4000, AQ3700, AQ2070	DW & WW
Copper	Powder	AC4P29	AQUAfast copper, bicinchoninate, powder	0.05 - 5.00 mg/L	Bicinchoninate	100	AQ4000, AQ3700	WW equivalent
	Auto-Test Ampoule	AC4029	AQUAfast IV copper (soluble)	0.5 - 12 mg/L	Bathocuproine	30	AQ4000	WW equivalent
	Tablet	AC2065	AQUAfast II zinc/copper	0.02 - 1.0 mg/L	Zincon	50	AQ4000, AQ3700, AQ2002	–
	Tablet	AC2029	AQUAfast II copper	0.05 - 5.0 mg/L	Biquinoline	50	AQ4000, AQ3700, AQ2005	–
Cyanide	Auto-Test Ampoule	AC4006	AQUAfast IV cyanide (free)	0.20 - 0.50 mg/L	Pyridine-barbituric acid	30	AQ4000, AQ3700	ETV verified, DW & WW equivalent
Cyanuric Acid	Tablet	AC2098	AQUAfast II cyanuric acid	5 - 90 mg/L	Melamine	100	AQ3070, AQ3700, AQ2003	–
Fluoride	Liquid	AC2009	AQUAfast II fluoride SPADNS kit, EPA-approved method	0.05 - 2.0 mg/L	SPADNS	50	AQ4000, AQ3700, AQ2009, AQ2020	DW & WW
Hydrazine	Tablet	AC2030	AQUAfast II hydrazine kit	0.05 - 0.50 mg/L	Dimethylamino-benzaldehyde	100	AQ4000, AQ3700, AQ2003	No requirement



Parameter	Reagent Type	Catalog Number	Description	Range	Method	Number of Tests	Meter Models	EPA Approved Methods
Iron	Powder	AC4P79	AQUAfast iron total TPTZ, powder	0 - 1.80 mg/L	TPTZ	100	AQ4000, AQ3700	–
	Powder	AC4P78	AQUAfast iron total ferro, powder	0 - 3.00 mg/L	1,10 Phenanthroline	100	AQ4000, AQ3700	WW equivalent
	Auto-Test Ampoule	AC4078	AQUAfast IV iron 1 (total & soluble)	0.45 - 7.0 mg/L	1,10 Phenanthroline	30	AQ4000	WW equivalent
	Tablet	AC2078	AQUAfast II iron	0.02 - 1.0 mg/L; 0.2 - 10 mg/L	TPTZ	100	AQ4000, AQ3700, AQ2005	–
Manganese	Powder	AC4P55	AQUAfast manganese HR, powder	0.2 - 20.0 mg/L	Periodate oxidation	100	AQ4000, AQ3700	WW equivalent
	Auto-Test Ampoule	AC4055	AQUAfast IV manganese	1.0 - 30 mg/L	Periodate oxidation	30	AQ4000, AQ3700	WW equivalent
	Tablet	AC2055	AQUAfast II manganese	0.05 - 4 mg/L	Formaldoxime	50	AQ4000, AQ3700, AQ2003	–
Molybdate	Powder	AC4P42	AQUAfast molybenum, molybdate, HR, powder	0 - 40.0 mg/L	Mercaptoacetic acid	100	AQ4000, AQ3700	–
Nitrate	Auto-Test Ampoule	AC4007	AQUAfast IV nitrate 3 (as NO_3)	5.0 - 50 mg/L	Cadmium reduction	30	AQ4000	DW & WW equivalent
	Auto-Test Ampoule	AC4005	AQUAfast IV nitrate 2 (as N)	0.40 - 3.0 mg/L	Cadmium reduction	30	AQ4000	DW & WW equivalent
	Auto-Test Ampoul	AC4004	AQUAfast IV nitrate (as N) LR	0.20 - 1.5 mg/L	Cadmium reduction	30	AQ4000	DW & WW equivalent
	Tablet	AC2007	AQUAfast II nitrate	1 - 40 mg/L	Zinc reduction	50	AQ4000, AQ3700, AQ2007	–
Nitrite	Powder	AC4P46	AQUAfast nitrite LR, powder	0 - 0.350 mg/L	Diazotization (Azo)	100	AQ4000, AQ3700	DW & WW equivalent
	Auto-Test Ampoule	AC4046	AQUAfast IV nitrite	0.080 - 0.80 mg/L	Diazotization (Azo)	30	AQ4000	DW & WW equivalent
	Tablet	AC2046	AQUAfast II nitrite, EPA-approved method	0.05 - 0.50 mg/L	Diazotization (Azo)	100	AQ4000, AQ3700, AQ2046	DW & WW
Oxygen	Auto-Test Ampoule	AC4008	AQUAfast IV oxygen	2.0 - 15 mg/L	Azo dye	30	AQ4000	–
Ozone	Auto-Test Ampoule	AC4048	AQUAfast IV ozone	0.20 - 2.5 mg/L	DDPD	30	AQ4000	–
	Tablet	AC2048	AQUAfast II ozone	0.05 - 0.5 mg/L	DPD/glycine	100	AQ3700, AQ2001	–
pH	Liquid	AC3001	AQUAfast II pH, dropper bottle	5.9 - 8.2	Phenol red	30	AQ3070, AQ3700	–
	Tablet	AC2001	AQUAfast II pH	6.5 - 8.4	Phenol red	100	AQ4000, AQ3700, AQ2001	–
Phosphate	Powder	AC4P95	AQUAfast phosphorus 3, powder	0.07 - 2.5 mg/L	Phosphormolybdic blue/ascorbic acid	100	AQ4000, AQ3700	DW & WW equivalent
	Auto-Test Ampoule	AC4095	AQUAfast IV phosphate 2-LR	0.75 - 8.0 mg/L	Stannous chloride	30	AQ4000, AQ3700	–
	Tablet	AC2096	AQUAfast II phosphorus HR	10 - 100 mg/L	Phosphormolybdic blue/ascorbic acid	50	AQ4000, AQ3700, AQ2003	DW & WW equivalent
	Tablet	AC2095	AQUAfast II phosphorus LR, EPA approval method	0.05 - 4.0 mg/L	Vanado molybdate	50	AQ4000, AQ3700, AQ2004	DW & WW
Silica	Powder	AC4P60	AQUAfast silica HR, powder packets	1.0 - 75.0 mg/L	Silicomolybdate	100	AQ4000, AQ3700	DW & WW equivalent
	Auto-Test Ampoule	AC4060	AQUAfast IV silica	1.0 - 14 mg/L	Heteropoly blue	30	AQ4000	DW equivalent
	Powder	AC2061	AQUAfast II silica phosphate removal	NA	NA	100	AQ4000, AQ3700, AQ2002	–
	Tablet	AC2060	AQUAfast II silica	0.05 - 4.0 mg/L	Silicomolybdate	50	AQ4000, AQ3700, AQ2002	DW & WW equivalent
Sulfate	Powder	AC4P82	AQUAfast sulfate 4, powder packets	2 - 70 mg/L	Barium sulfate/ turbidity	100	AQ4000, AQ3700	DW & WW equivalent
	Auto-Test Ampoule	AC4082	AQUAfast IV sulfate	8.0 - 100 mg/L	Barium sulfate/ turbidity	30	AQ4000	DW & WW equivalent
	Tablet	AC2082	AQUAfast II sulfate	5 - 200 mg/L	Barium sulfate/ turbidity	100	AQ4000, AQ3700, AQ2005	DW & WW equivalent
Sulfide	Auto-Test Ampoule	AC4016	AQUAfast IV sulfide (soluble)	0.3 - 3.0 mg/L	Methylene blue	30	AQ4000	WW equivalent
	Tablet	AC2016	AQUAfast II sulfide	0.05 - 0.50 mg/L	Methylene blue	50	AQ4000, AQ3700, AQ2004	WW equivalent
Zinc	Auto-Test Ampoule	AC4065	AQUAfast IV zinc	0.30 - 3.0 mg/L	Zincon	30	AQ4000	WW equivalent
	Tablet	AC2065	AQUAfast IV zinc/copper	0.02 - 1.0 mg/L	Zincon	50	AQ4000, AQ3700, AQ2002	WW equivalent



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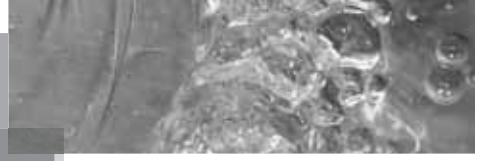
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- Ongoing support
- Flexible data reporting and analysis
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Auto Samplers	Automatic Sampling Systems	•	N/A	•	N/A
10060020	BOD AutoEZ	•	•	•	N/A

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