

## Thermo Scientific Orion Laboratory Products Catalog

### 2007 Product Overview

- pH
- ISE
- Dissolved Oxygen
- Conductivity
- Colorimetry
- Titration



# Thermo Scientific

## Orion Laboratory Products Catalog

• pH

• ISE

• DO

• Conductivity

• Colorimetry

• Titration



### Welcome to the NEW 2007 Thermo Scientific Orion Laboratory Products Catalog.

Thermo Scientific products help make the world healthier, cleaner and safer. In support of our mission, we are pleased to announce that all the pH electrodes in this catalog are Mercury-Free, environmentally friendly products. We are using a Mercury-Free icon in the catalog to highlight the new alternatives for Calomel (mercury) electrodes – these Mercury-Free electrodes are compatible with TRIS buffer, proteins and sulfides.

***There is no longer a reason to have a Mercury electrode in your laboratory!***

Whether you work in aquaculture, wastewater, food science or pharmaceuticals, our products are designed with the demands of your applications in mind. Our new catalog presents the most comprehensive offering of quality laboratory electrochemistry products, backed by our unsurpassed technical service and customer support teams. The catalog also introduces new product selection guides and icons to help with your purchasing decision.

World-wide sales and service support is available for all our products through a network of quality laboratory distributors. Please visit [www.thermo.com/water](http://www.thermo.com/water) for more product information and to place your order with your preferred Orion products distributor.

#### Customer Service

Our knowledgeable customer service team is here to help service our distribution partners. Please contact us for questions, to place orders, quote pricing, or to track shipments.

Call (800) 225-1480 / (978) 232-6000  
or fax (978) 232-6015.

#### Technical Support

Need more information or application assistance?

Contact our Tech Support Experts  
(800) 225-1480.

#### Specials and OEM's

Not finding exactly what you need?

Contact our OEM Team and we will provide a quote (800) 225-1480.

#### Service & Repair

We offer warranty and non-warranty repair, calibration and validation services, and preventive maintenance. See the inside back cover, visit [www.thermo.com/water](http://www.thermo.com/water), or call (800) 225-1480 for more details.

# Thermo Scientific Orion Products

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### Water Quality Specialist Tip

We have introduced new icons to help you locate the best product for your application.

#### **Best, Better, Good –**

Electrode ratings based upon electrode precision



#### **Mercury-Free –**

Environmentally safe electrodes for TRIS, proteins and sulfides



#### **Compliant with EPA testing method**



#### **Compliant with USP requirement**



#### **Hazardous Materials –**

Additional shipping charges



# Thermo Scientific Orion pH Electrode Families

2

The widest range of pH electrodes to meet the needs of any application



## Water Quality Specialist Tip

The information presented on the following pages will help you identify the best electrode for your application.

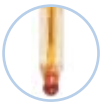
### Electrode Selection:

1. Choose your precision from the families on pages 2 and 3 using the **Best**, **Better**, and **Good** icons.
2. Select a glass or epoxy body and the body style for your sample requirements on page 4.
3. Choose the fill type, reference, and junction to suit your application on pages 4 and 5.
4. Finally, select the right connector for your meter on page 5.



### Orion ROSS Ultra® Premium pH Electrodes pg. 8

The best of the best! The fastest response, highest accuracy, and best reproducibility that you can get with a pH electrode – plus a 2 year warranty.



### Orion ROSS® Premium pH Electrodes pg. 10

Precise pH measurements with unmatched stability, reliability, and rapid response regardless of temperature or sample composition.



### Orion PerpHecT® pH Electrodes pg. 14

Designed to provide the best pH and temperature measurements when used with PerpHecT digital LogR meters.



### Orion AquaPro Professional pH Electrodes pg. 16

Low maintenance double junction electrodes with an extended life, fast response, and clog-resistant junction.



### Orion Standard pH Electrodes pg. 18

A large variety of quality electrodes for any application.





BEST



BETTER



GOOD



### Orion Micro pH Electrodes

pg. 20

A wide selection of electrodes designed to measure samples as small as 0.5  $\mu$ L and samples in 384 well plates.



### Orion Economy pH Electrodes

pg. 23

Value-priced, durable, and low maintenance pH electrodes.



### Orion Specialty pH Electrodes

pg. 21

Specialized pH electrodes for unique or challenging applications.



### Orion Basic pH Electrodes

pg. 23

For use with Russell meters and for basic pH measurement.



### Orion No Cal<sup>®</sup> pH Electrodes

pg. 21

The world's first pH electrode that does not require calibration!



### Orion pHuture<sup>®</sup> pH Electrodes

pg. 24

Non-glass technology that is a fast, accurate, and easy-to-maintain alternative to pH sensing glass.



### Orion KNIpHE<sup>®</sup> pH Electrode

pg. 22

The pH electrode is surrounded by a stainless blade for measuring meat, cheese, and sludge samples.



### Orion ATC Probes

pg. 25

Automatic temperature compensation probes for rapid temperature readings.



### Orion Double Junction pH Electrodes

pg. 22

Isolated Ag/AgCl reference system, so silver does not contaminate the sample. Great for TRIS buffer, sulfide, and dirty samples without the hazards of mercury.



### Orion Redox/ORP Electrodes

pg. 26

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





# Thermo Scientific Orion pH Electrode Selection Features

## pH Electrode Body

### Styles

#### Standard size

12 mm diameter for use in a wide variety of sample sizes



#### Semi-micro

6 to 8 mm diameter for sample sizes down to 200 µL



#### Micro

1 to 5 mm diameter for sample sizes down to 0.5 µL and containers as small as 384 well plates



#### Rugged bulb

When glass is required, extra durable pH bulb prevents breakage



#### Spear tip

For piercing solid or semi solid samples, 4.5 mm tip



#### Flat surface tip

For surface measurement of solid or gel samples and small volume samples



### Type

#### Glass body

Easy-to-clean and compatible with virtually any sample including solvents.



#### Epoxy body

Value-priced and extremely durable. Rugged body prevents breakage.



## pH Electrode Features

### Fill Type

#### Refillable

- Long-lasting and easily maintained with periodic filling and draining
- Suited for a wide range of applications
- 0.01 to 0.02 pH precision
- Best response time
- 1 to 2 year warranty (Non-ROSS Micro electrodes have a 6 month warranty)



#### Polymer Filled

- Low maintenance
- Sealed reference
- Easy to use
- Suited for a wide range of applications
- 0.02 pH precision
- Better response time
- 1 year warranty



#### Gel-Filled

- Low maintenance
- Easy to use
- 0.05 to 0.1 pH precision
- Good response time
- 3 to 6 month warranty



## Connector Reference

### References

#### ROSS® Reference

- 0.01 pH precision
- Best measurement response time
- Mercury-free, environmentally-friendly option for TRIS compatibility
- Variety of body styles and types
- Double junction, refillable design
- Best temperature response, electrode stable to 0.01 pH in 30 seconds with 50 °C temperature change



#### Double Junction Ag/AgCl Reference

- Mercury-free, environmentally-friendly option for TRIS compatibility
- Variety of body styles and types
- Refillable, polymer or low maintenance gel
- 0.02 pH precision
- Better measurement response time
- Good temperature response



#### Single Junction Ag/AgCl Reference

- General purpose reference for everyday use
- Variety of body styles and types
- Refillable or low maintenance gel
- 0.02 to 0.1 pH precision
- Good measurement response time
- Good temperature response

### Junctions

#### Sure-Flow®, Sleeve, and Laser-Drilled Hole (Open)

- Best junction for dirty, difficult samples
- Junction is clog-free
- Compatible with all sample types
- Ideal for thick or viscous samples



#### Ceramic

- Better junction for demanding lab use in a variety of samples
- High quality and durable
- Ideal for most lab applications



#### Wick and Glass Fiber

- Good junction for routine lab or field use in buffer or water samples
- Used in rugged epoxy body electrodes
- Suitable for aqueous samples



### Connectors

#### BNC Waterproof

pH

For use with any pH meter with a BNC input. Ensures a waterproof and secure connection when used with Orion Star Series meters



#### BNC

pH

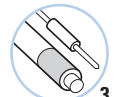
For use with any meter with a BNC input



#### U.S. Standard

pH

For use with older style meters with a U.S. standard input



#### Screw Cap

pH

Electrode can be connected to a variety of meter inputs using a separate cable. Refer to page 43 for available cables.



#### Pin Tip

pH

For use with meters with a reference half-cell input



#### MiniDIN

ATC

Ensures a waterproof and secure connection when used with Orion Star Series meters



#### 8 Pin DIN

ATC

For use with any meter with an 8 pin DIN ATC input, such as the Aplus meters



#### 3.5 mm Phono Tip

ATC

For use with any meter with a phono tip ATC input, such as the 535A, 550A, 555A, and PerpHect meters



# Thermo Scientific Orion pH Electrode Selection Guide

	Electrode Family	ROSS Ultra®	ROSS®	PerpHecT® ROSS®	PerpHecT® Ag/AgCl
	Rating Code / Pages	 pg. 8	 pg. 10	 pg. 14	 pg. 15
	pH Precision	0.01	0.01	0.01	0.01 to 0.05
<b>Markets</b>	Drinking Water	●	●	●	●
	Ultra Pure Water	●	●	●	●
	Wastewater	●	●	●	●
	General Lab & Education	●	●	●	●
	Environmental	●	●	●	●
	Food and Beverage	●	●	●	●
	Pharmaceutical	●	●	●	●
<b>Body Styles</b>	Standard Size	●	●	●	●
	Semi-Micro	●	●	●	●
	Micro			●	
	Rugged Bulb	●	●		
	Spear Tip		●		
	Flat Surface	●	●	●	
<b>Body</b>	Glass	●	●	●	●
	Epoxy	●	●	●	●
<b>Fill Types</b>	Refillable	●	●	●	●
	Polymer Filled				
	Gel Filled				●
<b>Reference Types</b>	ROSS	●	●	●	
	Double Junction Ag/AgCl				
	Single Junction Ag/AgCl				●
<b>Junction</b>	Sure-Flow, Sleeve, & Open		●	●	●
	Ceramic	●	●	●	●
	Glass Fiber & Wick	●	●	●	●
<b>Features</b>	TRIS, Protein, & Sulfide Compatible	●	●	●	
	Temperature Compensation			1	1, 2
	Warranty	2 years	1 year	1 year	6 months/ 1 year

## Key Information

1. LogR when used with a PerpHecT meter 2. pH/ATC Triode Available 3. Built-in ATC





# Thermo Scientific Orion ROSS Ultra® Premium pH Electrodes

8

**Superior stability, measurement speed, accuracy, and reproducibility under temperature variation.**

## The Best of the Best!!

The combination of benefits in the ROSS Ultra and ROSS lines cannot be found in any other pH electrode line. Before you make your next buying decision, consider these advantages.

The premium ROSS Ultra line contains six combination pH electrode styles and a half-cell reference electrode. ROSS Ultra electrodes are built upon unmatched ROSS technology and offer such great stability and drift improvements that the warranty period has been doubled!

These refillable electrodes have a two year replacement warranty. ROSS Ultra stability over time has been optimized to give less long term drift, ensuring more accuracy and less time recalibrating. The non-metallic, double-junction reference system offers benefits over the calomel and silver reference in both performance and electrode disposal issues. The liquid-liquid equilibration occurs almost instantaneously, saving time plus ensuring accurate results.

*“The speed and flexibility of the ROSS Ultra pH electrode allows us to switch easily between testing salt water and fresh water”*

— *New England Aquarium*

Complex, delicate samples, such as biological media, foods and pharmaceuticals, can be measured with ease. ROSS technology allows these electrodes to be used where metallic reference electrodes would contaminate the sample, require excessive cleaning to perform correctly, or potentially destroy the electrode in a short time. All ROSS Ultra electrodes can be used in samples that contain TRIS, sulfides or proteins. ROSS Ultra electrodes accommodate a change in filling solution for samples sensitive to potassium or chloride ions. ROSS Ultra offers the best temperature performance of all other electrodes in repeated, varying temperatures.

**Accurate, rapid results in a half-cell design**



**ROSS Ultra® reference half-cell with glass body**

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

<b>800500U<sup>5</sup></b>
<b>pH Range:</b> 0-14
<b>pH Precision:</b> –
<b>Temp. Range:</b> 0-100 °C
<b>Internal Reference:</b> ROSS
<b>Junction:</b> Ceramic
<b>Fill Solution:</b> 3 M KCl
<b>Dim.:</b> Length - 120 mm Dia. - 12 mm

www.thermo.com/water



Cat. No.	Recommended Accessories
810001	ROSS Storage Solution
810007	ROSS Fill Solution
910199	All-in-One pH Buffer Kit



**Environmentally-safe mercury-free option for TRIS, protein and sulfide**



BEST

*Top performance for QC and research applications*

*Ideal for QC applications with sample size limitations*

*Precise yet durable, for QC and research applications*

*For aqueous samples with size constraints*

*Ideal for soft solid and semi-solid samples*

*Top performance – precise pH analysis with durability*



**ROSS Ultra® combination pH electrode with glass body**

- For precise pH determinations
- General purpose, high performance

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

- Measures samples as small as 0.2 mL
- Fits test tubes and small containers

**ROSS Ultra® combination pH electrode with glass body, rugged bulb**

- Toughened bulb for rugged lab use

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

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

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

- Flat surface for measurements of moist surfaces such as agar gel plates, meat, and cheese

**ROSS Ultra® combination pH electrode with epoxy body**

- Epoxy body for ruggedness
- General purpose, high performance

8102BNUWP <sup>1</sup>	8103BNUWP <sup>1</sup>	8104BNUWP <sup>1</sup>	8115BNUWP <sup>1</sup>	8135BNUWP <sup>1</sup>	8156BNUWP <sup>1</sup>
<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14
<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01
<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C
<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS
<b>Junction:</b> Ceramic	<b>Junction:</b> Ceramic	<b>Junction:</b> Ceramic	<b>Junction:</b> Glass Fiber	<b>Junction:</b> Glass Fiber	<b>Junction:</b> Glass Fiber
<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl
<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 165 mm Tip: 6 mm x 95 mm L	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 165 mm Tip: 8 mm x 95 mm L	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm

**Key Information**

1). BNC Waterproof connector 5). Pin Tip connector All cap diameters are 16 mm at bottom of cap. All cable lengths are 1 meter.



1



5

# Thermo Scientific Orion ROSS® pH Electrodes

10

## Faster Response

If you are measuring samples that vary in temperature, or differ in temperature from your calibrating buffers, the special internal system of ROSS electrodes provides superior measurement stability, faster response, greater accuracy and more reproducible results than conventional electrodes. With ROSS electrodes you avoid long-term drift or inaccurate readings, even in samples that vary in temperature, while conventional electrodes produce unstable results until they reach thermal equilibrium with the sample.

## Temperature Response

The typical results in the graph below show how ROSS electrodes respond versus the best of conventional pH electrodes. In this case, both electrodes were taken from a pH 4.01 buffer solution at 25 °C and placed in the same buffer at 75 °C. The ROSS electrode almost immediately reported the correct value of the buffer, pH 4.13, at the new temperature. After three minutes, the conventional electrode had just started to move toward the 4.13 mark. When both electrodes were put back in the 25 °C

buffer, the ROSS electrode read 4.01 again in less than 30 seconds while the other electrode was considerably in error. The ROSS electrode continues to show fast reproducibility and accuracy after many, many dramatic temperature changes.

## No Sample Contamination

Conventional electrodes can leach metal ions into the filling solution and subsequently into the sample. ROSS electrodes do not contain silver or mercury that can react with the sample or clog the junction. Use ROSS pH electrodes where trace amounts of metal ions cannot be tolerated, in such samples as biological media, foodstuffs, and pharmaceuticals. All ROSS pH electrodes can be used in samples that contain TRIS, sulfides or proteins.

## Double Junction Design

This construction allows you more control over an important variable. Use a filling solution that is similar to the sample in order to minimize junction potential problems in high or low pH samples or non-aqueous solutions. Also change the filling solution to minimize contamination when

potassium or chloride in the sample is undesirable.

## Sure-Flow® Junction

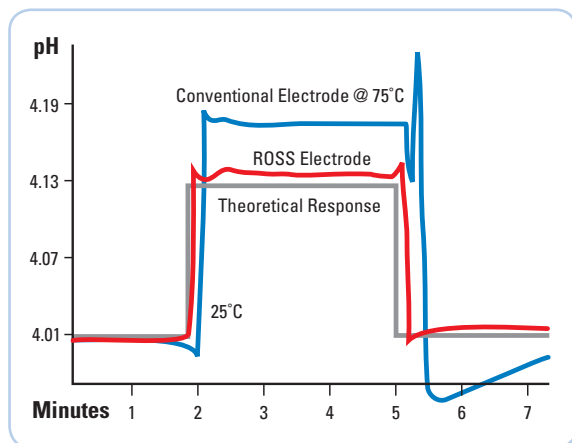
The unique, free-flowing liquid-to-liquid junction assures you of the most stable, drift-free measurements. The easy-to-clean junction never clogs, simply press the cap and flush the junction area. Release the cap and the junction is reset. Now even the most problematic, dirty or viscous samples can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

## Best for Routine pH

Use ROSS electrodes as your standard for all routine pH determinations. They will provide accurate, stable, fast, and reproducible results.

## Specifications Common to all ROSS Electrodes

- **Slope:** 92-102% of theoretical Nernst slope
- **Isopotential point:** pH 7
- **Accuracy of measuring a pH 6.86 buffer after standardization at 25 °C:** Accurate within 0.03 pH for buffer at any temperature between 0-100 °C using automatic temperature compensation.
- **Speed of response in 6.86 buffer going from 25 °C to 75 °C:** Response stable to 0.01 pH within 30 seconds
- **Speed of response between 6.86 and 4.01 buffers at 25 °C:** Response stable to 0.002 pH within 15 seconds

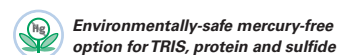


Temperature Response of the ROSS Ultra® and ROSS® Electrodes vs. Conventional Electrodes

www.thermo.com/water



Cat. No.	Recommended Accessories
810001	ROSS Storage Solution
810007	ROSS Fill Solution
910199	All-in-One pH Buffer Kit





BEST

*Accurate, rapid results in a half-cell design*



**ROSS® pH half-cell with glass body**

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

*For precise and reproducible pH determinations*



**ROSS® combination pH electrode with glass body**

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

*Fast, reliable results in small samples*



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

- Measures samples as small as 0.2 mL
- Fits test tubes and small containers

*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

*Dependable results in small samples*



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

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

8101BNWP <sup>1</sup> / 8101SC <sup>4</sup>	8102BN <sup>2</sup> / 810200 <sup>3</sup> 8102SC <sup>4</sup>	8103BN <sup>2</sup> / 810300 <sup>3</sup> 8103SC <sup>4</sup>	8104BN <sup>2</sup> / 810400 <sup>3</sup> 8104SC <sup>4</sup>	8115BN <sup>2</sup> / 8115SC <sup>4</sup>
<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14
<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01
<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C
<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS
<b>Junction:</b> –	<b>Junction:</b> Ceramic	<b>Junction:</b> Ceramic	<b>Junction:</b> Ceramic	<b>Junction:</b> Glass Fiber
<b>Fill Solution:</b> –	<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl
<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 165 mm <b>Tip:</b> 6 mm x 95 mm L	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 165 mm <b>Tip:</b> 8 mm x 95 mm L

**Key Information**

- 1). BNC Waterproof connector 2). BNC connector 3). US Standard connector  
4). Screw Cap connector, requires separate cable. All cap diameters are 16 mm at bottom of cap. All cable lengths are 1 meter.



1

2

3

4

ROSS and the COLL trademarks are trademarks of Thermo Fisher Scientific Inc. US Patent 6,793,787

# Thermo Scientific Orion ROSS® pH Electrodes

*For soft solid and semi-solid samples*



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

- Flat surface for measurements of moist surfaces such as agar gel plates, meat, and cheese

*Durable for precise pH applications*



**ROSS® combination pH electrode with epoxy body**

- Epoxy body for ruggedness
- General purpose, high performance

*For accurate pH analysis and titrations*



**ROSS® combination pH electrode with glass body, 14/15 standard taper**

- For titrators or vessels that require a standard taper joint

*For piercing semi-solid samples*



**ROSS® combination pH electrode with glass body, spear tip**

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

*Fast response—even in difficult samples*



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

- Sure-Flow junction prevents clogging, ideal for soil samples
- Durable epoxy design

8135BN <sup>2</sup> / 8135SC <sup>4</sup>	815600 <sup>2</sup> / 815500 <sup>3</sup> / 8155SC <sup>4</sup>	8162SC <sup>4</sup>	8163BNWP <sup>1</sup> / 8163SC <sup>4</sup>	8165BNWP <sup>1</sup> / 8165DN <sup>6</sup>
<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14
<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01
<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C
<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS
<b>Junction:</b> Glass Fiber	<b>Junction:</b> Glass Fiber	<b>Junction:</b> Sleeve	<b>Junction:</b> Ceramic	<b>Junction:</b> Sure-Flow
<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl
<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 110 mm <b>Tip:</b> 4.5 mm x 20 mm L	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm



Cat. No.	Recommended Accessories
810001	ROSS Storage Solution
810007	ROSS Fill Solution
910199	All-in-One pH Buffer Kit



Environmentally-safe mercury-free option for TRIS, protein and sulfide





BEST

**High performance in all samples**

**For difficult samples with size limitations**

**Accurate, rapid results in a half-cell design**



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

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

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

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

**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

**Water Quality Specialist Tip**

**Pure Water® Samples**

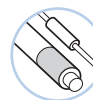
Common Problems: Slow Response, Drift, Irreproducible Results. Pure water samples cover a wide range of water types including distilled, deionized, process, well, surface, boiler feed, and rain water. These samples have relatively low ionic strength and are therefore poor conductors. Pure water solutions act as “antennae”, resulting in noisy electrode response. A second difficulty is the differences in ionic strength between the sample and the calibration buffers. After calibration in a high ionic strength buffer, a long stabilization period may occur in the pure water sample. The sample may also be contaminated if adequate rinsing is not performed or if the pH filling solution leaks into the sample over a period of time. The Pure Water test kit includes low ionic strength calibration buffers and a sample additive, pHISA, to increase the sample’s ionic strength for stable, reproducible readings.

*See page 41 for a complete list of Pure Water solution accessories*

<b>8172BNWP<sup>1</sup> / 8172DN<sup>6</sup></b>	<b>8175BNWP<sup>1</sup></b>	<b>800300<sup>5</sup></b>
<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14
<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01	<b>pH Precision:</b> –
<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C
<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS
<b>Junction:</b> Sure-Flow	<b>Junction:</b> Sure-Flow	<b>Junction:</b> Sure-Flow
<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl
<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 165 mm <b>Tip:</b> 8 mm x 95 mm L	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm

**Key Information**

- 1).** BNC Waterproof connector **2).** BNC connector **3).** US Standard connector  
**4).** Screw Cap connector, requires separate cable **5).** Pin Tip connector **6).** E DIN Waterproof connector, use with 260A, 261, 261S, 265A, 266, and 266S meters.  
**All** cap diameters are 16 mm at bottom of cap. **All** cable lengths are 1 meter.



1

2

3

4

5

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# Thermo Scientific Orion PerpHecT<sup>®</sup> ROSS<sup>®</sup> pH Electrodes

The ideal electrodes for PerpHecT<sup>®</sup> meters for LogR<sup>™</sup> temperature measurements



*Ideal for precise and reliable pH analysis*



**PerpHecT<sup>®</sup> ROSS<sup>®</sup> combination pH electrode with glass body**

- For QC and research applications

*Precise measurements of small samples*



**PerpHecT<sup>®</sup> ROSS<sup>®</sup> combination pH electrode with glass body, semi-micro**

- Measure samples as small as 0.2 mL
- Fits test tubes and small containers

*Accurate in extremely small samples*



**NEW**

**PerpHecT<sup>®</sup> ROSS<sup>®</sup> 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

*For soft solid and semi-solid samples*



**PerpHecT<sup>®</sup> ROSS<sup>®</sup> combination pH electrode with epoxy body, flat surface**

- Flat surface for measurements of moist surfaces such as agar gel plates, meat, and cheese

*Durability and reliability for precise pH*



**PerpHecT<sup>®</sup> ROSS<sup>®</sup> combination pH electrode with epoxy body**

- Epoxy body for ruggedness and durability

*High performance in all samples*



**PerpHecT<sup>®</sup> ROSS<sup>®</sup> Sure-Flow<sup>®</sup> combination pH electrode with glass body**

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

www.thermo.com/water

8202BN <sup>2</sup>	8203BN <sup>2</sup>	8220BNWP <sup>1</sup>	8235BN <sup>2</sup>	8256BN <sup>2</sup>	8272BN <sup>2</sup>
<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14
<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01
<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C
<b>Temp. Accuracy:</b> ± 0.5 °C	<b>Temp. Accuracy:</b> ± 0.5 °C	<b>Temp. Accuracy:</b> ± 0.5 °C	<b>Temp. Accuracy:</b> ± 0.5 °C	<b>Temp. Accuracy:</b> ± 0.5 °C	<b>Temp. Accuracy:</b> ± 0.5 °C
<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS	<b>Internal Reference:</b> ROSS
<b>Junction:</b> Ceramic	<b>Junction:</b> Ceramic	<b>Junction:</b> Sleeve	<b>Junction:</b> Glass Fiber	<b>Junction:</b> Glass Fiber	<b>Junction:</b> Sure-Flow
<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl	<b>Fill Solution:</b> 3 M KCl
<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 165 mm Tip: 6 mm x 95 mm L	<b>Dim.:</b> Length - 155 mm Tip: 3 mm x 40 mm L	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm



**Cat. No. Recommended Accessories**

- 810001** ROSS Storage Solution
- 810007** ROSS Fill Solution
- 900011** Ag/AgCl Fill Solution
- 910199** All-in-One pH Buffer Kit



Environmentally safe mercury-free option for TRIS, protein and sulfide

# Thermo Scientific Orion PerpHecT® pH Electrodes



*Ideal for everyday use*



**PerpHecT® combination pH electrode with glass body**

- General purpose
- For routine or research applications

*For samples with size limitations*



**PerpHecT® combination pH electrode with glass body, semi-micro**

- Measure samples as small as 0.2 mL
- Fits test tubes and small containers

*Easy to use and low maintenance*



**PerpHecT® combination pH electrode with epoxy body, low maintenance gel**

- Low maintenance gel electrode
- For rugged field, plant, or educational use

*Low maintenance plus built-in ATC*



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

- Low maintenance gel with built-in ATC
- pH and ATC connectors for PerpHecT meters

*For reliable pH measurements*



**PerpHecT® combination pH electrode with epoxy body**

- Epoxy body for ruggedness and durability
- Ideal for routine or research applications

*For analysis of difficult samples*



**PerpHecT® Sure-Flow® combination pH electrode with glass body**

- Sure-Flow junction prevents clogging
- For samples such as soil, colloids, viscous material, and organic solvents

9202BN <sup>2</sup>	9203BN <sup>2</sup>	9206BN <sup>2</sup>	9207BN <sup>2, c</sup>	9256BN <sup>2</sup>	9272BN <sup>2</sup>
<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14
<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.05	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.01	<b>pH Precision:</b> 0.01
<b>Temp. Range:</b> 0-90 °C	<b>Temp. Range:</b> 0-90 °C	<b>Temp. Range:</b> 0-80 °C	<b>Temp. Range:</b> 0-80 °C	<b>Temp. Range:</b> 0-90 °C	<b>Temp. Range:</b> 0-100 °C
<b>Temp. Accuracy:</b> ± 0.5 °C	<b>Temp. Accuracy:</b> ± 0.5 °C	<b>Temp. Accuracy:</b> ± 0.5 °C	<b>Temp. Accuracy:</b> ± 0.1 °C	<b>Temp. Accuracy:</b> ± 0.5 °C	<b>Temp. Accuracy:</b> ± 0.5 °C
<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl
<b>Junction:</b> Ceramic	<b>Junction:</b> Ceramic	<b>Junction:</b> Wick	<b>Junction:</b> Wick	<b>Junction:</b> Glass Fiber	<b>Junction:</b> Sure-Flow
<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill Solution:</b> --	<b>Fill Solution:</b> --	<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> 4 M KCl with Ag/AgCl
<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 165 mm <b>Tip:</b> 6.5 mm x 100 mm L	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm

## Key Information

**1).** BNC Waterproof connector **2).** BNC connector **C).** 3.5 mm Phono Tip connector (ATC), use with 310, 320, 330, 350, 370, 535A, 550A, 555A, and 162A meters  
**All** cap diameters are 16 mm at bottom of cap. **All** cable lengths are 1 meter.



# Thermo Scientific Orion AquaPro Professional pH Electrodes

Ideal for environmental and field testing of water and wastewater samples

**Reliable and accurate**



**AquaPro combination pH electrode with low maintenance polymer, glass body**

- General purpose, high performance

**Fast response in small samples**



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

- Measure samples as small as 0.2 mL
- Fits test tubes and small containers

**Precise and durable**



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

- Toughened bulb for rugged lab use

**Rugged with built-in ATC**



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

- Low maintenance with built-in ATC probe

9102AP <sup>2</sup>	9103APWP <sup>1</sup>	9104APWP <sup>1</sup>	9107APMD <sup>1, A</sup>
<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14
<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02
<b>Temp. Range:</b> 0-60 °C	<b>Temp. Range:</b> 0-60 °C	<b>Temp. Range:</b> 0-60 °C	<b>Temp. Range:</b> 0-60 °C
<b>Internal Ref.:</b> Ag/AgCl Double Junction	<b>Internal Ref.:</b> Ag/AgCl Double Junction	<b>Internal Ref.:</b> Ag/AgCl Double Junction	<b>Internal Ref.:</b> Ag/AgCl Double Junction
<b>Junction:</b> Open	<b>Junction:</b> Open	<b>Junction:</b> Open	<b>Junction:</b> Open
<b>Fill Solution:</b> --	<b>Fill Solution:</b> --	<b>Fill Solution:</b> --	<b>Fill Solution:</b> --
<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 165 mm <b>Tip:</b> 6.5 mm x 100 mm L	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm

**Cat. No. Recommended Accessories**

- |        |                            |
|--------|----------------------------|
| 910001 | Electrode Storage Solution |
| 910199 | All-in-One pH Buffer Kit   |



Environmentally-safe mercury-free option for TRIS, protein and sulfide



BETTER

**Stable readings in small samples**



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

- Measure samples as small as 0.2 mL
- Durable epoxy body

**For soft solids and semi-solids**



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

- Flat surface for measurements of moist surfaces such as agar gel plates, meat, and cheese

**Rugged and accurate**



**AquaPro combination pH electrode with low maintenance polymer, epoxy body**

- General purpose, high performance

9115APWP <sup>1</sup>	9135APWP <sup>1</sup>	9156APWP <sup>1</sup>
<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14
<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02
<b>Temp. Range:</b> 0-60 °C	<b>Temp. Range:</b> 0-60 °C	<b>Temp. Range:</b> 0-60 °C
<b>Internal Ref.:</b> Ag/AgCl Double Junction	<b>Internal Ref.:</b> Ag/AgCl Double Junction	<b>Internal Ref.:</b> Ag/AgCl Double Junction
<b>Junction:</b> Open	<b>Junction:</b> Open	<b>Junction:</b> Open
<b>Fill Solution:</b> --	<b>Fill Solution:</b> --	<b>Fill Solution:</b> --
<b>Dim.:</b> Length - 165 mm Tip: 8 mm x 90 mm L	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm

**Key Information**

1). BNC Waterproof connector 2). BNC connector A). MiniDIN connector (ATC), use with Orion Star Series meters All cap diameters are 16 mm at bottom of cap. All cable lengths are 1 meter.

**Water Quality Specialist Tip**

Extend the life of your electrode by keeping it clean! We have all the electrode cleaning products you need for your sample applications.

**Cat. No. pH Electrode Cleaning Solutions**


**900020 pH Cleaning Solution Kit-**  
Includes 1 x 15 mL each of cleaning solutions A, B, C and D; beaker and pipette

**900021 pH Cleaning Solution A-**  
For removing protein contaminants. Includes 4 x 15 mL bottles, beaker and pipette

**900022 pH Cleaning Solution B-**  
For removing bacterial contaminants. Includes 4 x 15 mL bottles, beaker and pipette

**900023 pH Cleaning Solution C-**  
For general cleaning. Includes 4 x 15 mL bottles, beaker and pipette

**900024 pH Cleaning Solution D-**  
For removing oil and grease contaminants. Includes 4 x 15 mL bottles, beaker and pipette

 **Signifies a hazardous solution. See terms and conditions for important shipping information at [www.thermo.com/water](http://www.thermo.com/water).**

See page 40 to for a complete listing of pH electrode cleaning solutions.



# Thermo Scientific Orion Standard pH Electrodes

*Accurate results in a half-cell*



**pH half-cell with glass body**

- Use with 900100 or 900200 reference electrodes

*Easy-to-clean bulb in a half-cell design*



**Low resistance pH half-cell with glass body, rugged bulb**

- For routine or clean water measurements
- Use with 900100 reference electrode

*General purpose for everyday use*



**Combination pH electrode with glass body**

- For routine or research applications

*For samples with size constraints*



**Combination pH electrode with glass body, semi-micro**

- Measure samples as small as 0.2 mL
- Fits test tubes and small containers

*Durable and reliable*



**Combination pH electrode with glass body, rugged bulb**

- Toughened bulb for rugged lab use

*Low maintenance with built-in ATC*



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

- Low maintenance gel with built-in ATC
- Epoxy body for ruggedness

9101BN <sup>2</sup> / 9101SC <sup>4</sup>	9161BN <sup>2</sup> / 9161SC <sup>4</sup>	9102BNWP <sup>1</sup> / 9102SC <sup>4</sup>	9103BNWP <sup>1</sup> / 9103SC <sup>4</sup>	9104BNWP <sup>1</sup> / 9104SC <sup>4</sup>	(9107BNMD <sup>1,A</sup> / 9107WMD <sup>1,A</sup> / 9107WMD <sup>1,A</sup> ) * 9107BN <sup>2,B</sup> / 9107WP <sup>7,D</sup>
<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14
<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02
<b>Temp. Range:</b> 0-90 °C	<b>Temp. Range:</b> 0-90 °C	<b>Temp. Range:</b> 0-90 °C	<b>Temp. Range:</b> 0-90 °C	<b>Temp. Range:</b> 0-90 °C	<b>Temp. Range:</b> 0-80 °C
<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl
<b>Junction:</b> –	<b>Junction:</b> –	<b>Junction:</b> Ceramic	<b>Junction:</b> Ceramic	<b>Junction:</b> Ceramic	<b>Junction:</b> Wick
<b>Fill Solution:</b> –	<b>Fill Solution:</b> –	<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill Solution:</b> –
<b>Dim.:</b> Length - 110 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 165 mm <b>Tip:</b> 6.5 mm x 100 mm L	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm

## Key Information

- 1). BNC Waterproof connector
- 2). BNC connector
- 3). U.S. Standard connector
- 4). Screw Cap connector, requires separate cable
6. E DIN Waterproof connector, use with 260A, 261, 261S, 265A, 266, and 266S meters
- 7). E DIN connector, use with 260, 265, and 1230 meters
- A). MiniDIN connector (ATC), use with Orion Star Series meters
- B). 8 Pin DIN connector (ATC), use with 210A/Aplus, 230A/Aplus, 250A/Aplus 410A/Aplus, 420A/Aplus, 520A/Aplus, 525A/Aplus, 710A/Aplus, 420A/Aplus, 420A/Aplus,

Cat. No.	Recommended Accessories
910001	Electrode Storage Solution
900011	Ag/AgCl Fill Solution
910199	All-in-One pH Buffer Kit



**Low maintenance with built-in ATC**



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

- Low maintenance gel with built-in ATC
- Epoxy body for ruggedness

**General purpose and reliable**



**Combination pH electrode with epoxy body**

- Epoxy body for ruggedness and durability
- For routine or research applications

**Durable with built-in ATC**



**pH/ATC Triode™ with epoxy body, refillable**

- Long-lasting with built-in ATC
- Epoxy body for ruggedness

**Rugged with an easy-to-clean bulb**



**Low resistance combination pH electrode with glass body, rugged bulb**

- For routine or clean water measurements

**Fast response in difficult samples including soil**



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

- Sure-Flow junction prevents clogging
- Rugged, durable epoxy design

**For all samples including solvents**



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

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

<b>9109WP<sup>6,D</sup> / 9109WL<sup>5,D*</sup></b>	<b>9156BNWP<sup>1</sup> / 915500<sup>3</sup> / 9156SC<sup>4</sup></b>	<b>9157BNMD<sup>1,A</sup> / 9157BN<sup>2,B</sup></b>	<b>9162BNWP<sup>1</sup> / 9162SC<sup>4</sup></b>	<b>9165BNWP<sup>1</sup></b>	<b>9172BNWP<sup>1</sup></b>
<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14
<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02
<b>Temp. Range:</b> 0-90 °C	<b>Temp. Range:</b> 0-90 °C	<b>Temp. Range:</b> 0-90 °C	<b>Temp. Range:</b> 0-90 °C	<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C
<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl
<b>Junction:</b> Wick	<b>Junction:</b> Ceramic	<b>Junction:</b> Ceramic	<b>Junction:</b> Ceramic	<b>Junction:</b> Sure-Flow	<b>Junction:</b> Sure-Flow
<b>Fill Solution:</b> --	<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> 4 M KCl with Ag/AgCl
<b>Dim.:</b> Length - 120 mm Dia. - 12 mm Cap Dia. - 22 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm

520A/Aplus, 525A/Aplus, 710A/Aplus, 720A/Aplus, 920A/Aplus meters  
**D).** Banana Plug connector (ATC) **All** cap diameters are 16 mm at bottom of cap except where noted. **All** cable lengths are 1 meter except where noted.

\* **9107BNMD** – 1.5 meter cable; **9107WMMMD** – 3 meter cable;  
**9107WLMD** – 6 meter cable; **9109WL** – 6 meter cable



# Thermo Scientific Orion Micro pH Electrodes

*Measure samples as small as 5  $\mu$ L*



**Micro combination pH electrode with glass body**

- Designed for test tubes and small containers
- Measure samples as small as 5  $\mu$ L

*For small test tubes and micro-titer plates*



**Micro combination pH electrode with glass body, small length**

- Measure samples as small as 5  $\mu$ L

*Measure samples as small as 0.5  $\mu$ L*



**Micro combination pH electrode with glass body, small tip**

- Designed for gels and small sample volumes
- Measure samples as small as 0.5  $\mu$ L

*For use in NMR tubes*



**Micro combination pH electrode with glass body, long length**

- Ideal for measurements in extremely small vessels

*For piercing septa*



**Micro combination pH electrode with needle tip**

- 16 gauge stainless steel bevel tip

9802BN <sup>2</sup>	9803BN <sup>2</sup>	9810BN <sup>2</sup>	9826BN <sup>2</sup>	9863BN <sup>2</sup>
<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14
<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02
<b>Temp. Range:</b> 0-80 °C	<b>Temp. Range:</b> 0-80 °C	<b>Temp. Range:</b> 0-80 °C	<b>Temp. Range:</b> 0-80 °C	<b>Temp. Range:</b> 0-80 °C
<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl
<b>Junction:</b> Ceramic	<b>Junction:</b> Ceramic	<b>Junction:</b> Ceramic	<b>Junction:</b> Ceramic	<b>Junction:</b> Ceramic
<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> 4 M KCl with Ag/AgCl
<b>Dim.:</b> Length - 150 mm <b>Tip:</b> 2.5 mm x 18 mm L	<b>Dim.:</b> Length - 83 mm <b>Tip:</b> 2.5 mm x 48 mm L	<b>Dim.:</b> Length - 120 mm <b>Tip:</b> 1.3 mm x 37 mm L	<b>Dim.:</b> Length - 228 mm <b>Tip:</b> 2.5 mm x 2.5 mm L	<b>Dim.:</b> Length - 137 mm <b>Tip:</b> 1.7 mm x 40 mm L
<b>Depth of Immersion:</b> 2 mm	<b>Depth of Immersion:</b> 2 mm	<b>Depth of Immersion:</b> 1 mm	<b>Depth of Immersion:</b> 2 mm	<b>Depth of Immersion:</b> 3 mm



**Cat. No. Recommended Accessories**

910001	Electrode Storage Solution
900011	Ag/AgCl Fill Solution
510011	No Cal Fill Solution
910199	All-in-One pH Buffer Kit

**Key Information**

1). BNC Waterproof connector 2). BNC connector 4). Screw Cap connector, requires separate cable 6). E DIN Waterproof connector, use with 260A, 261, 261S, 265A, 266, and 266S meters 8). Module only, requires separate 93 Series electrode handle (9300BNWP, 930000, or 9300SC) A). MiniDIN connector (ATC), use with Orion Star Series meters

# Thermo Scientific Orion Specialty pH Electrodes



*For piercing semi-solid samples*



**Combination pH electrode with glass body, spear tip**

- For soft, moist samples such as cheese, meat, fruit, and agar plates

*For reliable pH analysis and titrations*



**Combination pH electrode with glass body, 14/15 standard taper**

- For titrators or vessels that require a standard taper joint

*For titrations of thick or difficult samples*



**Combination pH electrode with glass body, sleeve junction**

- For use with most titrators to titrate thick, viscous samples

*For surface measurements of small samples*



**Combination pH electrode with glass body, semi-micro, flat surface**

- For small volume samples and micro-titer plates

*For samples that contain hydrofluoric acid*



**HF Resistant pH module**

- Must order 93 Series electrode handle and 900200 reference electrode to make a complete system
- Non-glass, plastic membrane sensor

*Electrode maintains calibration for one year*



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

- Designed for stable, high performance pH analysis in the field

9163SC <sup>4</sup>	9164SC <sup>4</sup>	9166SC <sup>4</sup>	9167SC <sup>4</sup>	930101 <sup>8</sup>	5107BNMD <sup>1,A</sup> / 5107NC <sup>2,B</sup> / 5109NC <sup>6,D</sup>
<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-4	<b>pH Range:</b> 0-14
<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.1
<b>Temp. Range:</b> 0-90 °C	<b>Temp. Range:</b> 0-90 °C	<b>Temp. Range:</b> 0-90 °C	<b>Temp. Range:</b> 0-90 °C	<b>Temp. Range:</b> 0-40 °C	<b>Temp. Range:</b> 0-100 °C
<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> --	<b>Internal Ref.:</b> Patent Pending
<b>Junction:</b> Ceramic	<b>Junction:</b> Ceramic	<b>Junction:</b> Sleeve	<b>Junction:</b> Ceramic	<b>Junction:</b> --	<b>Junction:</b> Ceramic
<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill Solution:</b> --	<b>Fill Solution:</b> No Cal
<b>Dim.:</b> Length - 95 mm <b>Tip:</b> 4 mm x 23 mm L	<b>Dim.:</b> Length - 100 mm Dia. - 12 mm	<b>Dim.:</b> Length - 125 mm <b>Tip:</b> 6 mm x 14 mm L	<b>Dim.:</b> Length - 105 mm <b>Tip:</b> 4 mm x 19 mm L	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm

**B)**, 8 Pin DIN connector (ATC), use with 210A/Aplus, 230A/Aplus, 250A/Aplus, 410A/Aplus, 420A/Aplus, 520A/Aplus, 525A/Aplus, 710A/Aplus, 720A/Aplus, 920A/Aplus meters **D)**, Banana Plug connector (ATC). **All** cap diameters are 16 mm at bottom of cap. **All** cable lengths are 1 meter.



## Thermo Scientific Orion KNIpHE®



GOOD

*For meat, cheese and sludge samples*



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

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

#### 9120APWP<sup>1,9</sup>

**pH Range:** 0-14

**pH Precision:** 0.02

**Temp. Range:** 0-60 °C

**Internal Ref.:** Ag/AgCl Double Junction

**Junction:** Ceramic

**Fill Solution:** 3 M KCl

**Dim.:** Length - 215 mm  
Dia. - 16 mm

## Thermo Scientific Orion Double Junction



GOOD

*Accurate and reliable*



### Double Junction combination pH electrode with glass body

- General purpose
- Easy-to-clean refillable design

#### 9102DJWP<sup>1</sup>

**pH Range:** 0-14

**pH Precision:** 0.02

**Temp. Range:** 0-60 °C

**Internal Ref.:** Ag/AgCl Double Junction

**Junction:** Ceramic

**Fill Solution:** 3 M KCl

**Dim.:** Length - 120 mm  
Dia. - 12 mm

*For samples with size limitations*



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

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

#### 9110DJWP<sup>1</sup>

**pH Range:** 0-14

**pH Precision:** 0.02

**Temp. Range:** 0-60 °C

**Internal Ref.:** Ag/AgCl Double Junction

**Junction:** Ceramic

**Fill Solution:** 3 M KCl

**Dim.:** Length - 150 mm  
**Tip:** 4.5 mm x 90 mm L

*Durable and low maintenance*



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

- Low maintenance gel with durable epoxy body

#### 9156DJWP<sup>1</sup>

**pH Range:** 0-14

**pH Precision:** 0.02

**Temp. Range:** 0-60 °C

**Internal Ref.:** Ag/AgCl Double Junction

**Junction:** Wick

**Fill Solution:** --

**Dim.:** Length - 120 mm  
Dia. - 12 mm



#### Cat. No. Recommended Accessories

910008	3 M KCl Fill Solution
900011	Ag/AgCl Fill Solution
910001	Electrode Storage Solution
910199	All-in-One pH Buffer Kit



Environmentally-safe mercury-free option for TRIS, protein and sulfide

# Thermo Scientific Orion Economy Line



# Thermo Scientific Basic Electrodes



For rugged,  
everyday use



**Combination pH electrode with epoxy body, low maintenance gel**

- Ideal for field, plant, or educational applications

For everyday use  
in small samples



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

- Measure samples as small as 0.2 mL

For everyday use  
in tall containers



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

- Designed for use in long-necked flasks

For solids and  
semi-solids



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

- Flat surface for analysis of moist surfaces

New product releases for  
Russell meters and for  
basic pH measurements



**NEW**

**9142BN**

Refillable combination pH electrode with glass body

**9145BN**

Low maintenance gel combination pH electrode with epoxy body

**9146BN**

Low maintenance gel combination pH electrode with epoxy body and removable bulb guard

**9147BN**

Low maintenance gel combination pH electrode with epoxy body and built-in ATC (BNC and 2.5 mm Phono Jack connections, for use with Russell RL060P meter)

**917004**

Stainless Steel ATC Probe (2.5 mm Phono Jack, for use with Russell meters)

910500 <sup>3</sup> / 9106BNWP <sup>1</sup>	911600 <sup>2</sup>	912600 <sup>2</sup>	913600 <sup>2</sup>
<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-12	<b>pH Range:</b> 0-12	<b>pH Range:</b> 0-12
<b>pH Precision:</b> 0.05	<b>pH Precision:</b> 0.1	<b>pH Precision:</b> 0.1	<b>pH Precision:</b> 0.1
<b>Temp. Range:</b> 0-80 °C	<b>Temp. Range:</b> 0-80 °C	<b>Temp. Range:</b> 0-80 °C	<b>Temp. Range:</b> 0-80 °C
<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl
<b>Junction:</b> Wick	<b>Junction:</b> Wick	<b>Junction:</b> Wick	<b>Junction:</b> Wick
<b>Fill Solution:</b> --	<b>Fill Solution:</b> --	<b>Fill Solution:</b> --	<b>Fill Solution:</b> --
<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 145 mm Dia. - 6 mm	<b>Dim.:</b> Length - 305 mm Dia. - 8 mm	<b>Dim.:</b> Length - 110 mm Dia. - 12 mm

## Key Information

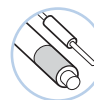
1). BNC Waterproof connector 2). BNC connector 3). U.S. Standard connector  
9). 9120APWP KNIpHE electrode kit includes pH electrode, electrode handle, removable blade, one bottle of filling solution, and instruction manual All cap diameters are 16 mm at bottom of cap. All cable lengths are 1 meter.



1



2



3

Visit [www.thermo.com/water](http://www.thermo.com/water) for information on Russell meters.

# Thermo Scientific Orion pHuture® and pHuture MMS™

*Non-glass with  
built-in ATC  
function*



**pHuture MMS™ Sure-Flow® Non-glass pH/ATC Triode™**

- Sure-Flow junction prevents clogging

*Non-glass with  
built-in ORP and  
ATC functions*



**pHuture MMS™ Sure-Flow® Non-glass pH/ORP/ATC Quatrode™**

- Sure-Flow junction prevents clogging

*Non-glass plus  
clog-free*



**pHuture® Sure-Flow® Non-glass combination pH electrode**

- Sure-Flow junction prevents clogging

*Non-glass and  
low maintenance*



**pHuture® Non-glass combination pH electrode, low maintenance gel**

- Low maintenance

<b>616600</b> <sup>10</sup>	<b>617900</b> <sup>10</sup>	<b>616500</b> <sup>11</sup> / <b>616501</b> <sup>12</sup>	<b>615700</b> <sup>11</sup> / <b>615701</b> <sup>12</sup>
<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14
<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02	<b>pH Precision:</b> 0.02
<b>Temp. Range:</b> 0-85 °C	<b>Temp. Range:</b> 0-85 °C	<b>Temp. Range:</b> 0-85 °C	<b>Temp. Range:</b> 0-85 °C
<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl
<b>Junction:</b> Sure-Flow	<b>Junction:</b> Sure-Flow	<b>Junction:</b> Sure-Flow	<b>Junction:</b> Wick
<b>Fill:</b> 3 M KCl with Ag/AgCl	<b>Fill:</b> 3 M KCl with Ag/AgCl	<b>Fill:</b> 3 M KCl with Ag/AgCl	<b>Fill:</b> –
<b>Dim.:</b> Length - 110 mm Dia. - 13 mm	<b>Dim.:</b> Length - 110 mm Dia. - 13 mm	<b>Dim.:</b> Length - 110 mm Dia. - 13 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm

www.thermo.com/water



#### Cat. No. Recommended Accessories

<b>610011</b>	pHuture Fill Solution
<b>910199</b>	All-in-One pH Buffer Kit

#### Key Information

**10).** 13 Pin DIN connector, use with 555A, 535A, 635, and 630 meters **11).** 8 Pin DIN connector, use with 610 and 620 meters **12).** pHuture electrode with conversion box, use with any pH meter with a BNC input **A).** MiniDIN connector (ATC), use with Orion Star Series meters **B).** 8 Pin DIN connector, use with 210A/Aplus, 230A/Aplus, 250A/Aplus, 410A/Aplus, 420A/Aplus, 520A/Aplus,



# Thermo Scientific Orion ATC Probes



**Fastest temperature response**

**Rugged stainless steel**

**Durable epoxy**

**Solvent-resistant glass**



**NEW**



**Micro ATC Probe with Stainless Steel and Epoxy Body**

- For critical temperature monitoring
- Measures samples as small as 10  $\mu$ L
- Minimum depth of immersion is 3 mm

**ATC Probe with Stainless Steel Body**

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

**ATC Probe with Epoxy Body**

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

**ATC Probe with Glass Body**

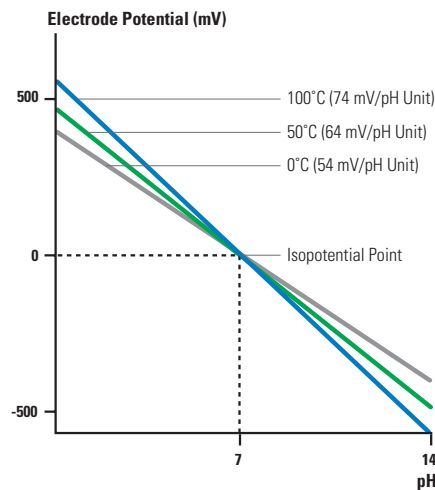
- For solutions that contain organic solvents

928007MD <sup>A</sup>	927007MD <sup>A</sup> / 917007 <sup>B</sup> / 927007 <sup>C</sup> / 917008 <sup>D</sup>	927005MD <sup>A</sup> / 917005 <sup>B</sup> / 927005 <sup>C</sup> / 917001 <sup>E</sup>	927006MD <sup>A</sup> / 917006 <sup>B</sup> / 927006 <sup>C</sup> / 917002 <sup>E</sup>
<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-80 °C	<b>Temp. Range:</b> 0-100 °C
<b>Temp. Accuracy:</b> $\pm 1$ °C	<b>Temp. Accuracy:</b> $\pm 1$ °C	<b>Temp. Accuracy:</b> $\pm 1$ °C	<b>Temp. Accuracy:</b> $\pm 1$ °C
<b>Dim.:</b> Length - 117 mm Dia. - 5 mm	<b>Dim.:</b> Length - 120 mm Dia. - 6 mm	<b>Dim.:</b> Length - 120 mm Dia. - 6 mm	<b>Dim.:</b> Length - 120 mm Dia. - 8 mm
<b>Tip:</b> 1 mm x 38 mm L			

**Water Quality Specialist Tip**

Temperature is the number one source for pH error! The ideal solution is an ATC probe – now your pH measurement is accurate and EPA compliant.

**Change of pH Slope with Temperature**



**pH Value versus Temperature**

25 °C	0 °C	5 °C	10 °C	20 °C	30 °C
1.68	1.67	1.67	1.67	1.67	1.68
3.78	3.86	3.84	3.82	3.79	3.77
4.01	4.00	4.00	4.00	4.00	4.02
6.86	6.98	6.95	6.95	6.87	6.85
7.00	7.11	7.08	7.08	7.01	6.98
7.41	7.53	7.50	7.50	7.43	7.40
9.18	9.46	9.40	9.40	9.23	9.14
10.01	10.32	10.25	10.25	10.06	9.97
12.46	13.42	13.21	13.21	12.64	12.30

40 °C	50 °C	60 °C	70 °C	80 °C	90 °C
1.69	1.71	1.72	1.74	1.77	1.79
3.75	3.75	--	--	--	--
4.03	4.06	4.08	4.13	4.16	4.21
6.84	6.83	6.84	6.85	6.86	6.88
6.97	6.97	--	--	--	--
7.38	7.37	--	--	--	--
9.07	9.01	8.96	8.92	8.89	8.85
9.89	9.83	--	--	--	--
11.99	11.71	--	--	--	--

525A/Aplus, 710A/Aplus **C**), 3.5 mm Phono Jack connector (ATC), use with 310, 320, 330, 350, 370, 535A, 550A, 555A, and 162A meters **D**), Banana Plug connector (ATC), use with 260, 260A, 261, 261S, 265, 265A, 266, 266S, and 1230 meters **E**). Dual Banana Plug connector (ATC), use with older Orion meters and EA940 meter **All** cap diameters are 16 mm at bottom of cap. **All** cable lengths are 1 meter



# Thermo Scientific Orion Redox/ORP and ORP Triode™



BEST



BETTER



GOOD

26

**Durable and log-free**



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

- For use in water, wastewater, metal plating, and biotech samples

**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

<b>9678BNWP<sup>1</sup> / 967800<sup>3</sup></b>	<b>9778BNWP<sup>1</sup> / 9778SC<sup>4</sup></b>	<b>9180BNMD<sup>1,A</sup> / 9180BN<sup>2,B</sup></b>	<b>9179BNMD<sup>1,A</sup> / 9179BN<sup>2,B</sup></b>
<b>Temp. Range:</b> 0-90 °C	<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-90 °C	<b>Temp. Range:</b> 0-80 °C
<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl
<b>Junction:</b> Sure-Flow	<b>Junction:</b> Ceramic	<b>Junction:</b> Glass Fiber	<b>Junction:</b> Wick
<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> –
<b>Dim.:</b> Length - 110 mm Dia. - 13 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm

www.thermo.com/water



Cat. No.	Recommended Accessories
967901	ORP Standard, 475 mL
967961	ORP Standard, 5 x 60 mL
900011	Ag/AgCl Fill Solution
900001	Single Junction Fill Solution
900002	Double Junction Fill Solution- Inner Chamber
900003	Double Junction Fill Solution- Outer Chamber

## Key Information

**1).** BNC Waterproof connector **2).** BNC connector **3).** U.S. Standard connector **4).** Screw Cap connector, requires separate cable **5).** Pin Tip connector **13).** Double Pin Tip connector, use with meters with a Karl Fischer input **A).** MiniDIN connector (ATC), use with Orion Star Series meters **B).** 8 Pin DIN connector (ATC), use with 210A/Aplus, 230A/Aplus, 250A/Aplus, 410A/Aplus, 420A/Aplus, 520A/Aplus, 525A/Aplus, 710A/Aplus **All** cap diameters are 16 mm at bottom of cap. **All** cable lengths are 1 meter

# Thermo Scientific Orion Sure-Flow<sup>®</sup> Reference Electrodes

For routine pH and many ISE measurements



**Single Junction Sure-Flow<sup>®</sup> reference half-cell with epoxy body**

- Use with 9101BN, 9101SC, 9161BN or 9161SC pH half-cell electrodes
- Compatible with several ISEs

For use with ISE half-cell electrodes



**Double Junction Sure-Flow<sup>®</sup> reference half-cell with epoxy body**

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

# Thermo Scientific Orion Silver Billet and Karl Fischer Electrodes

For Karl Fischer titrations



**Karl Fischer double platinum electrode with glass body**

- For accurate Karl Fischer titrations

For halide titrations



**Silver Billet combination electrode**

- For accurate and reliable halide titrations

For halide titrations

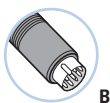
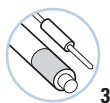


**Silver Billet half-cell electrode**

- Use with 900200 reference electrode

900100 <sup>5</sup>	900200 <sup>5</sup>
<b>pH Range:</b> 0-14	<b>pH Range:</b> 0-14
<b>Temp. Range:</b> 0-100 °C	<b>Temp. Range:</b> 0-100 °C
<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl Double Junction
<b>Junction:</b> Sure-Flow	<b>Junction:</b> Sure-Flow
<b>Fill:</b> Equitransferent solution with Ag/AgCl	<b>Fill:</b> Equitransferent solution with Ag/AgCl (inner) and 10% KNO <sub>3</sub> (outer)
<b>Dim.:</b> Length - 110 mm Dia. - 13 mm	<b>Dim.:</b> Length - 110 mm Dia. - 13 mm

977900 <sup>13</sup>	9780SC <sup>4</sup>	9781SC <sup>4</sup>
<b>Endpoint indicator</b>	<b>Endpoint indicator</b>	<b>Endpoint indicator</b>
<b>Temp. Range:</b> 0-40 °C	<b>Temp. Range:</b> 0-80 °C	<b>Temp. Range:</b> 0-80 °C
<b>Internal Ref.:</b> Platinum	<b>Internal Ref.:</b> Ag/AgCl	<b>Internal Ref.:</b> Ag/AgCl
<b>Junction:</b> --	<b>Junction:</b> Ceramic	<b>Junction:</b> --
<b>Fill:</b> --	<b>Fill:</b> 4 M KCl with Ag/AgCl	<b>Fill:</b> --
<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm	<b>Dim.:</b> Length - 120 mm Dia. - 12 mm



# Thermo Scientific Orion Ion Selective Electrode Families

**Ion Selective Electrodes (ISE) have been designed to provide you with the best in performance and reliability.**

Measurement by ISE is applicable in virtually every laboratory. Use ISEs to measure ion concentrations in water, food, pharmaceuticals, and biological samples. Analytical methods using ISEs have been developed and published throughout the world. The main advantages of electrode technology are the variety of analytical methods available. Ion selective electrodes can be used as endpoint indicators or to perform direct measurements and incremental techniques.

### Save Time and Money

Electrode measurements are simpler and faster than other analytical techniques. Time-consuming sample preparation steps such as filtrations and distillations are rarely needed. Analysis time is typically under one minute. In comparison to other methods, such as atomic absorption or ion chromatography, the initial cost of setup is less and does not require additional, expensive readout equipment. Methods are adaptable to both lab and field use. Sample color or turbidity does not affect the measurement.

*Accurate sodium analysis in a half-cell design*



#### Orion ROSS® Sodium Half-Cell Electrode

- ROSS measurement system offers precise readings with unmatched stability, reliability, and rapid response
- Use with 800300 ROSS Sure-Flow or 800500U ROSS Ultra reference electrodes

*Easy-to-clean surface in a half-cell design*



#### Orion Solid State Half-Cell Electrodes

- The measuring surface can be easily cleaned using polishing strips, Cat. No. 948201
- Use with 900100 single junction or 900200 double junction reference electrodes

*Replaceable sensing module in a half-cell design*



#### Orion Plastic Membrane Half-Cell Electrodes

- The sensing module is replaceable, so the electrode can be easily and economically rejuvenated
- Use with 900100 single junction or 900200 double junction reference electrodes

### Recommended Accessories

Cat. No.	ISE Membranes
	<b>9512 Ammonia-</b>
951204	20 Loose Membranes
951205	3 Bonded Membranes
	<b>950204 Carbon Dioxide-</b>
	4 Membranes with O-rings
	<b>954604 Nitrogen Oxide-</b>
	20 Loose Membranes

See pages 41 and 42 for a complete list of ISE accessories

### Key Information

1). BNC Waterproof connector 2). BNC connector 3). US Standard connector 4). Screw Cap connector, requires separate cable 8). Module only, requires separate 93 Series electrode handle (9300BNWP, 930000, or 9300SC) All cap diameters are 16 mm at bottom of cap. All cable lengths are 1 meter.



BEST



BETTER



GOOD

*Fast, accurate measurements of dissolved gases*



**Orion Gas Sensing Electrodes**

- Sensing membrane measures dissolved gases in solution
- Reference is built-in, so a separate reference electrode is not required
- Low detection limits
- Fast response

*Replaceable sensing module plus a clog-free junction*



**Orion ionplus® Plastic Membrane Combination Electrodes**

- The sensing module is replaceable, so the electrode can be easily and economically rejuvenated
- Built-in Sure-Flow reference provides fast and stable readings
- Combination design decreases the amount of required sample and reduces waste.

*Easy-to-clean surface plus a clog-free junction*



**Orion ionplus® Solid State Combination Electrodes**

- The measuring surface can be easily cleaned using polishing strips, Cat. No. 948201
- Built-in Sure-Flow reference provides fast and stable readings
- Combination design decreases the amount of required sample and reduces waste

*Top performance sodium electrode plus a clog-free junction*



**Orion ROSS® Sodium Combination Electrode**

- ROSS measurement system offers precise readings with unmatched stability, reliability, and rapid response
- Built-in Sure-Flow reference provides fast and stable readings
- Combination design decreases the amount of required sample and reduces waste.

*Measure sodium in extremely small samples*



**Orion Micro Sodium Combination Electrode**

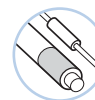
- Easy to clean and maintain
- Able to measure extremely small samples with a tip diameter of 3.2 mm and a minimum depth of immersion of 1.5 mm.



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4

# Thermo Scientific Orion Ion Selective Electrode Selection Guide

30

www.thermo.com/water

Species	Cat. No.	Construction	Measurement Range	Optimum Temperature Range	Required Reference Electrode	Reference Filling Solution	Calibration Standards	Required ISA
<b>EPA</b> Ammonia (NH <sub>3</sub> )	9512BNWP <sup>1</sup> 951201 <sup>3</sup>	Gas sensing combination	1.0 to 5 x 10 <sup>-7</sup> M 17,000 to 0.01 ppm	0 - 50 °C	Included	951202	0.1 M NH <sub>4</sub> Cl / 951006	951211 
Ammonium (NH <sub>4</sub> <sup>+</sup> )	931801 <sup>8</sup>	Plastic membrane half-cell	1.0 to 5 x 10 <sup>-7</sup> M 17,000 to 0.01 ppm	0 - 50 °C	900200	900002 inner / 900018 outer	1000 ppm as N / 951007	--
<b>Bromide (Br) ionplus Design</b>	9635BNWP <sup>1</sup>	ionplus Sure-Flow solid state combination	1.0 to 5 x 10 <sup>-6</sup> M 79,900 to 0.40 ppm	0 - 80 °C	Included	900063	0.1 M NaBr / 943506	940011
<b>Bromide (Br)</b>	9435BN <sup>2</sup> 9435SC <sup>4</sup>	Solid state half-cell	1.0 to 5 x 10 <sup>-6</sup> M 79,900 to 0.40 ppm	0 - 80 °C	900200	900002 inner / 900003 outer	0.1 M NaBr / 943506	940011
<b>Cadmium (Cd<sup>2+</sup>) ionplus Design</b>	9648BNWP <sup>1</sup>	ionplus Sure-Flow solid state combination	0.1 to 10 <sup>-7</sup> M 11,200 to 0.01 ppm	0 - 80 °C	Included	900061	Consult instruction manual	940011
<b>Cadmium (Cd<sup>2+</sup>)</b>	9448BN <sup>2</sup> 9448SC <sup>4</sup>	Solid state half-cell	0.1 to 10 <sup>-7</sup> M 11,200 to 0.01 ppm	0 - 80 °C	900200	900002 inner / 900003 outer	Consult instruction manual	940011
<b>Calcium (Ca<sup>2+</sup>) ionplus Design</b>	9720BNWP <sup>1</sup>	ionplus Sure-Flow plastic membrane combination	1.0 to 5 x 10 <sup>-7</sup> M 40,100 to 0.02 ppm	0 - 40 °C	Included	900061	0.1 M CaCl <sub>2</sub> / 922006 100 ppm CaCO <sub>3</sub> / 923206	932011
<b>Calcium (Ca<sup>2+</sup>)</b>	9320BN <sup>2</sup>	Plastic membrane half-cell	1.0 to 5 x 10 <sup>-7</sup> M 40,100 to 0.02 ppm	0 - 40 °C	900100	900011	0.1 M CaCl <sub>2</sub> / 922006 100 ppm CaCO <sub>3</sub> / 923206	932011
<b>Carbon Dioxide (CO<sub>2</sub>)</b>	9502BNWP <sup>1</sup>	Gas sensing combination	10 <sup>-2</sup> to 10 <sup>-4</sup> M 440 to 4.4 ppm	0 - 50 °C	Included	950202	0.1 M NaHCO <sub>3</sub> / 950206 1000 ppm as CaCO <sub>3</sub> / 950207	950210
<b>EPA</b> Chloride (Cl <sup>-</sup> ) ionplus Design	9617BNWP <sup>1</sup>	ionplus Sure-Flow solid state combination	1.0 to 5 x 10 <sup>-5</sup> M 35,500 to 1.8 ppm	0 - 80 °C	Included	900062	0.1 M NaCl / 941706 100 ppm Cl <sup>-</sup> / 941707 1000 ppm Cl <sup>-</sup> / 941708	940011 or 941709 / CISA 
<b>EPA</b> Chloride (Cl <sup>-</sup> )	9417BN <sup>2</sup> 9417SC <sup>4</sup>	Solid state half-cell	1.0 to 5 x 10 <sup>-5</sup> M 35,500 to 1.8 ppm	0 - 80 °C	900200	900002 inner / 900003 outer	0.1 M NaCl / 941706 100 ppm Cl <sup>-</sup> / 941707 1000 ppm Cl <sup>-</sup> / 941708	940011 or 941709 / CISA 
<b>EPA</b> Chloride (Cl <sup>-</sup> )	931701 <sup>8</sup>	Plastic membrane half-cell	1.0 to 5 x 10 <sup>-6</sup> M 35,500 to 0.18 ppm	0 - 50 °C	900200	900002 inner / 0.1 M KCl outer	0.1 M NaCl / 941706 100 ppm Cl <sup>-</sup> / 941707 1000 ppm Cl <sup>-</sup> / 941708	None required
<b>Chlorine (Cl<sub>2</sub>)</b>	9770BNWP <sup>1</sup> 9770SC <sup>4</sup>	Solid state combination	3 x 10 <sup>-4</sup> to 10 <sup>-7</sup> M 20 to 0.01 ppm	0 - 50 °C	Included	None required	100 ppm as Cl <sub>2</sub> / 977007	977010 / iodide reagent 977011 / acid reagent 
<b>Cupric (Cu<sup>2+</sup>) ionplus Design</b>	9629BNWP <sup>1</sup>	ionplus Sure-Flow solid state combination	0.1 to 10 <sup>-8</sup> M 6350 to 6.4 x 10 <sup>-4</sup> ppm	0 - 80 °C	Included	900063	0.1 M Cu(NO <sub>3</sub> ) <sub>2</sub> / 942906	940011
<b>Cupric (Cu<sup>2+</sup>)</b>	9429BN <sup>2</sup> 9429SC <sup>4</sup>	Solid state half-cell	0.1 to 10 <sup>-8</sup> M 6350 to 6.4 x 10 <sup>-4</sup> ppm	0 - 80 °C	900200	900002 inner / 900003 outer	0.1 M Cu(NO <sub>3</sub> ) <sub>2</sub> / 942906	940011
<b>Cyanide (CN<sup>-</sup>) ionplus Design</b>	9606BNWP <sup>1</sup>	ionplus Sure-Flow solid state combination	10 <sup>-2</sup> to 8 x 10 <sup>-6</sup> M 260 to 0.2 ppm	0 - 80 °C	Included	900062	Consult instruction manual	951011 
<b>Cyanide (CN<sup>-</sup>)</b>	9406BN <sup>2</sup> 9406SC <sup>4</sup>	Solid state half-cell	10 <sup>-2</sup> to 8 x 10 <sup>-6</sup> M 260 to 0.2 ppm	0 - 80 °C	900200	900002 inner / 900003 outer	Consult instruction manual	951011 
<b>EPA</b> Fluoride (F <sup>-</sup> ) ionplus Design	9609BNWP <sup>1</sup> 960900 <sup>3</sup>	ionplus Sure-Flow solid state combination	Saturated to 10 <sup>-6</sup> M Saturated to 0.02 ppm	0 - 80 °C	Included	900061	0.1 M NaF / 940906 100 ppm F <sup>-</sup> / 940907 1 ppm F <sup>-</sup> w/TISAB II / 040906 2 ppm F <sup>-</sup> w/TISAB II / 040907 10 ppm F <sup>-</sup> w/TISAB II / 040908	940909 / TISAB II 940911 / TISAB III
<b>EPA</b> Fluoride (F <sup>-</sup> )	9409BN <sup>2</sup> 940900 <sup>3</sup> 9409SC <sup>4</sup>	Solid state half-cell	Saturated to 10 <sup>-6</sup> M Saturated to 0.02 ppm	0 - 80 °C	900100	900001	0.1 M NaF / 940906 100 ppm F <sup>-</sup> / 940907 1 ppm F <sup>-</sup> w/TISAB II / 040906 2 ppm F <sup>-</sup> w/TISAB II / 040907 10 ppm F <sup>-</sup> w/TISAB II / 040908	940909 / TISAB II 940911 / TISAB III
<b>Fluoroborate (BF<sub>4</sub><sup>-</sup>)</b>	9305BN <sup>2</sup>	Plastic membrane half-cell	1.0 to 7 x 10 <sup>-6</sup> M 86,800 to 0.6 ppm	0 - 40 °C	900200	900002 inner / dilute ISA outer	Consult instruction manual	930711

## Key Information




1). BNC Waterproof connector 2). BNC connector 3). US Standard connector 4). Screw Cap connector, requires separate cable 8). Module only, requires separate 93 Series electrode handle (9300BNWP, 930000, or 9300SC) All cap diameters are 16 mm at bottom of cap. All cable lengths are 1 meter.



Compliant with EPA testing method.



Signifies a hazardous solution. See terms and conditions for important shipping information at [www.thermo.com/water](http://www.thermo.com/water).

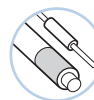
Species	Cat. No.	Construction	Measurement Range	Optimum Temperature Range	Required Reference Electrode	Reference Filling Solution	Calibration Standards	Required ISA
<b>Iodide (I<sup>-</sup>)</b> ionplus Design	9653BNWP <sup>1</sup>	ionplus <sup>®</sup> Sure-Flow <sup>®</sup> solid state combination	1.0 to 5 x 10 <sup>-8</sup> M 127,000 to 5 x 10 <sup>-3</sup> ppm	0 - 80 °C	Included	900063	0.1 M NaI / 945306	940011
<b>Iodide (I<sup>-</sup>)</b>	9453BN <sup>2</sup> 9453SC <sup>4</sup>	Solid state half-cell	1.0 to 5 x 10 <sup>-8</sup> M 127,000 to 5 x 10 <sup>-3</sup> ppm	0 - 80 °C	900200	900002 inner / 900003 outer	0.1 M Na / 945306	940011
<b>Lead (Pb<sup>2+</sup>)</b> ionplus Design	9682BNWP <sup>1</sup>	ionplus Sure-Flow solid state combination	0.1 to 10 <sup>-6</sup> M 20,700 to 0.2 ppm	0 - 80 °C	Included	900062	0.1 M Pb(ClO <sub>4</sub> ) <sub>2</sub> / 948206 0.1 M Na <sub>2</sub> SO <sub>4</sub> / 948207	Consult instruction manual
<b>Lead (Pb<sup>2+</sup>)</b>	9482BN <sup>2</sup> 9482SC <sup>4</sup>	Solid state half-cell	0.1 to 10 <sup>-6</sup> M 20,700 to 0.2 ppm	0 - 80 °C	900200	900002 inner / 900003 outer	0.1 M Pb(ClO <sub>4</sub> ) <sub>2</sub> / 948206 0.1 M Na <sub>2</sub> SO <sub>4</sub> / 948207	Consult instruction manual
<b>EPA Nitrate (NO<sub>3</sub><sup>-</sup>)</b> ionplus Design	9707BNWP <sup>1</sup>	ionplus Sure-Flow plastic membrane combination	1.0 to 7 x 10 <sup>-6</sup> M 14,000 to 0.1 ppm as N	0 - 40 °C	Included	900046	0.1 M NaNO <sub>3</sub> / 920706 1000 ppm N / 920707 100 ppm N / 930707	930711 or 930710 / nitrate ISS
<b>EPA Nitrate (NO<sub>3</sub><sup>-</sup>)</b>	9307BNWP <sup>1</sup>	Plastic membrane half-cell	1.0 to 7 x 10 <sup>-6</sup> M 14,000 to 0.1 ppm as N	0 - 40 °C	900200	900002 inner / 900046 or ISA outer	0.1 M NaNO <sub>3</sub> / 920706 1000 ppm N / 920707 100 ppm N / 930707	930711 or 930710 / nitrate ISS
<b>Nitrite (NO<sub>2</sub><sup>-</sup>)</b> ionplus Design	9746BNWP <sup>1</sup>	ionplus Sure-Flow plastic membrane combination	1.4 x 10 <sup>-2</sup> to 3.6 x 10 <sup>-6</sup> M 100 to 0.02 ppm	0 - 40 °C	Included	900046	0.1 M NaNO <sub>2</sub> / 954606	934610
<b>Nitrite (NO<sub>2</sub><sup>-</sup>)</b>	9346BN <sup>2</sup> 934600 <sup>3</sup>	Plastic membrane half-cell	1.4 x 10 <sup>-2</sup> to 3.6 x 10 <sup>-6</sup> M 100 to 0.02 ppm	0 - 40 °C	900100	900046	0.1 M NaNO <sub>2</sub> / 954606	934610
<b>Nitrogen Oxide (NO<sub>x</sub>)</b>	9546BN <sup>2</sup> 954600 <sup>3</sup>	Gas sensing combination	5 x 10 <sup>-3</sup> to 4 x 10 <sup>-6</sup> M 230 to 0.18 ppm	0 - 50 °C	Included	954602	0.1 M NaNO <sub>2</sub> / 954606	956410 
<b>Perchlorate (ClO<sub>4</sub><sup>-</sup>)</b>	938101 <sup>8</sup>	Plastic membrane half-cell	1.0 to 7 x 10 <sup>-6</sup> M 99,500 to 0.7 ppm	0 - 40 °C	900200	900002 inner / dilute ISA outer	Consult instruction manual	930711
<b>Potassium (K<sup>+</sup>)</b> ionplus Design	9719BNWP <sup>1</sup>	ionplus Sure-Flow plastic membrane combination	1.0 to 10 <sup>-6</sup> M 39,000 to 0.04 ppm	0 - 40 °C	Included	900065	0.1 M KCl / 921906	931911
<b>Potassium (K<sup>+</sup>)</b>	9319BN <sup>2</sup>	Plastic membrane half-cell	1.0 to 10 <sup>-6</sup> M 39,000 to 0.04 ppm	0 - 40 °C	900200	900002 inner / dilute ISA outer	0.1 M KCl / 921906	931911
<b>Silver/Sulfide (Ag<sup>+</sup>/S<sup>2-</sup>)</b> ionplus Design	9616BNWP <sup>1</sup>	ionplus Sure-Flow solid state combination	1.0 to 10 <sup>-7</sup> M 107,900 to 0.01 ppm as Ag <sup>+</sup> 32,100 to 0.003 ppm as S <sup>2-</sup>	0 - 80 °C	Included	900062 for Ag <sup>+</sup> /S <sup>2-</sup> 900067 for Ag <sup>+</sup> 900061 for S <sup>2-</sup>	Consult instruction manual	940011 for Ag <sup>+</sup> 941609 for S <sup>2-</sup> 
<b>Silver/Sulfide (Ag<sup>+</sup>/S<sup>2-</sup>)</b>	9416BN <sup>2</sup> 9416SC <sup>4</sup>	Solid state half-cell	1.0 to 10 <sup>-7</sup> M 107,900 to 0.01 ppm as Ag <sup>+</sup> 32,100 to 0.003 ppm as S <sup>2-</sup>	0 - 80 °C	900200	900002 inner / 900003 outer	Consult instruction manual	940011 for Ag <sup>+</sup> 941609 for S <sup>2-</sup> 
<b>Sodium (Na<sup>+</sup>)</b>	8611BNWP <sup>1</sup>	ROSS <sup>®</sup> Sure-Flow combination	Saturated to 10 <sup>-6</sup> M Saturated to 0.02 ppm	0-100 °C	Included	900010 or 900012 for low level Na <sup>+</sup>	10 ppm Na <sup>+</sup> / 941105 100 ppm Na <sup>+</sup> / 941107 1000 ppm Na <sup>+</sup> / 841108 KA Std. Kit, 1 M NaCl with ISA / 650700 0.1 M NaCl / 941706	841111 841113 / reconditioning solution
<b>Sodium (Na<sup>+</sup>)</b>	8411BN <sup>2</sup>	ROSS half-cell	Saturated to 10 <sup>-6</sup> M Saturated to 0.02 ppm	0 - 100 °C	800300 or 800500U	900010 or 900012 for low level Na <sup>+</sup>	10 ppm Na <sup>+</sup> / 941105 100 ppm Na <sup>+</sup> / 941107 1000 ppm Na <sup>+</sup> / 841108 KA Std Kit, 1 M NaCl with ISA / 650700 0.1 M NaCl / 941706	841111 841113 / reconditioning solution
<b>Sodium (Na<sup>+</sup>)</b>	9811BN	Micro combination	Saturated to 10 <sup>-6</sup> M Saturated to 0.02 ppm	0 - 80 °C	Included	900004	0.1 M NaCl / 941706	841111
<b>Surfactant</b>	9342BN <sup>2</sup>	Plastic membrane half-cell	Endpoint indicator	0 - 40 °C	900200	900002 inner / 810007 outer	0.5 M Hyamine titrant / 654201	654203 / sample additive
<b>Thiocyanate (SCN<sup>-</sup>)</b>	9458BN <sup>2</sup>	Solid state half-cell	1.0 to 5 x 10 <sup>-6</sup> M 58,100 to 0.29 ppm	0 - 50 °C	900200	900002 inner / 900003 outer	Consult instruction manual	940011
<b>Water Hardness (Ca<sup>2+</sup>)</b>	9332BNWP <sup>1</sup>	Plastic membrane half-cell	1.0 to 6 x 10 <sup>-6</sup> M	0 - 50 °C	900100	900011	100 ppm CaCO <sub>3</sub> / 923206 0.1 M CaCl <sub>2</sub> / 922006	None required



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# 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.

**Durable and accurate DO probes for the lab or field**



**AUTO-STIR™ probe for BOD applications**



083005A<sup>F</sup> / 083010A<sup>F</sup> / 083005D<sup>B</sup> / 083005MD<sup>A</sup> / 083010MD<sup>A</sup> / 083025MD<sup>A</sup> / 083060MD<sup>A</sup>

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

086020A<sup>G</sup> / 086030MD<sup>A,C</sup>

- For lab applications
- Self-stirring with One-Touch control

## Recommended Accessories

Cat. No.	DO Membranes & Solution
080513	<b>DO Maintenance Kit A–</b> 083005MD, 083010MD, 083025MD, 083060MD, 086030MD, 083005A, 083010A, 083025A, 083060A, 083005D, 086020A, 083150A, 083010F, 081010F, 081030F
080113	<b>DO Maintenance Kit B–</b> 080510MD, 081010MD, 081010
080515	<b>1 Membrane Cap–</b> 083005MD, 083010MD, 083025MD, 083060MD, 086030MD, 083005A, 083010A, 083025A, 083060A, 083005D, 086020A, 083150A 083010F, 081010F, 081030F
081003	<b>3 Membrane Caps–</b> 080510MD, 081010MD, 081010
970801	<b>1 Pre-Filled Membrane Cap–</b> 970899WP, 970800
080514	<b>Polarographic Electrolyte Solution–</b> 083005MD, 083010MD, 083025MD, 083060MD, 086030MD, 083005A, 083010A, 083025A, 083060A, 083005D, 086020A, 083150A, 083010F, 081010F, 081030F, 080510MD, 081010MD, 081010

See page 42 for a complete list of DO accessories

## Key Information

- 1). BNC Waterproof connector 3.) US Standard connector A). MiniDIN connector  
B). 8 Pin DIN connector C). 3.5 mm Phono Tip Stirrer Jack connector  
F). 8 Pin Waterproof DIN G). 13 Pin DIN connector



BEST



BETTER



GOOD

**Reliable DO probes for the lab or field**



**081010<sup>B</sup> / 081010MD<sup>A</sup>**

- For lab and field applications
- Rugged epoxy body

**Rugged DO probes plus probe guard**



**081010F<sup>B</sup> / 083010F<sup>F</sup> / 080510MD<sup>A</sup>**

- For field applications
- Includes probe guard

**DO probe plus stainless steel probe guard**



**083150A<sup>F</sup>**

- For field applications
- Includes probe guard and 50 meter cable

**Convert any pH meter into a DO meter**



**970800<sup>3</sup> / 970899WP<sup>1</sup>**

- For lab applications
- Works on pH meters with BNC or U.S. Standard connections



1



3



A



B



C



F



G

# Thermo Scientific Orion Dissolved Oxygen Probe Selection Guide

## Dissolved Oxygen Probes

Cat. No.	Cable Length	Meter Compatibility	Application	Response Time	Minimum Sample Flow	Oxygen Consumption	Maximum Allowed Overpressure	Sample Temperature
083005A <sup>F</sup> 083010A <sup>F</sup>	1.5 m 3 m	830A, 835A, 862A	Laboratory / Field	90% of final value in 10 sec; 95% of final value in 15 sec; 99% of final value in 60 sec	10 cm/sec	0.008 µg/h (mg/L) <sup>-1</sup> at 20 °C	6 BAR	0 to 50 °C
083005D <sup>B</sup>	1.5 m	810Aplus, 850Aplus						
083005MD <sup>A</sup> 083010MD <sup>A</sup> 083025MD <sup>A</sup> 083060MD <sup>A</sup>	1.5 m 3 m 10 m 20 m	Star Series						
086020A <sup>G</sup> 086030MD <sup>A,C</sup>	2 m 2 m	862A Star Series, Benchtop Models	Laboratory	90% of final value in 10 sec; 95% of final value in 15 sec; 99% of final value in 60 sec	10 cm/sec	0.008 µg/h (mg/L) <sup>-1</sup> at 20 °C	6 BAR	0 to 50 °C
081010 <sup>B</sup> 081010MD <sup>A</sup>	3 m 3 m	805Aplus, 810Aplus, 850 Aplus Star Series	Laboratory / Field	90% of final value in 10 sec; 95% of final value in 16 sec; 99% of final value in 60 sec	20 cm/sec	--	--	0 to 50 °C
081010F <sup>B</sup> 083010F <sup>F</sup> 080510MD <sup>A</sup>	3 m 3 m 3 m	810Aplus, 850Aplus 830A, 835A Star Series	Field	90% of final value in 10 sec; 95% of final value in 18 sec; 99% of final value in 60 sec	10 cm/sec	0.008 µg/h (mg/L) <sup>-1</sup> at 20 °C	10 BAR	0 to 50 °C
083150A <sup>F</sup>	50 m	830A, 835A	Field	90% of final value in 10 sec; 95% of final value in 18 sec; 99% of final value in 60 sec	20 cm/sec	0.06 µg/h (mg/L) <sup>-1</sup> at 20 °C	10 BAR	0 to 50 °C
970800 <sup>3*</sup> 970899WP <sup>1*</sup>	1 m 1 m	pH meter with US Std. Connector pH meter with BNC Connector	Laboratory	96% response in less than 30 sec between oxygen-free and air saturated water at 22 °C	--	0.1 mg/hr	--	0 to 45 °C

### Key Information

\* **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 Caps	Maintenance Kit
Dual thermally separated	Approx. 0.1% per day	180 days	-5 to 50 °C	Membrane Cap- 080515 Solution- 080514	080513
Dual, thermally separated	Approx. 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)	Approx. 0.1% per day	180 days	- 5 to 50 °C	Membrane Cap for 080510MD- 081003 Membrane Cap for 081010F & 083010F- 080515 Solution- 080514	For 080510MD- 080113 For 081010F & 083010F- 080513
Dual, thermally separated	< 0.3% per day	180 days	- 5 to 50 °C	Membrane Cap- 080515 Solution- 080514	080513
Dual, thermally separated	--	--	--	Pre-Filled Membrane Cap- 970801	--

## Connector Reference

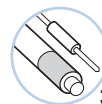
### BNC Waterproof

For use with any pH meter with a BNC input. Ensures a waterproof and secure connection when used with Orion Star Series meters



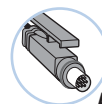
### U.S. Standard

For use with older style pH meters that have a U.S. standard input



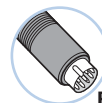
### MiniDIN

Ensures a waterproof and secure connection when used with Orion Star Series DO meters



### 8 Pin DIN

For use with any DO meter with an 8 pin DIN input



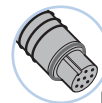
### 3.5 mm Phono Tip Stirrer Jack

For use with Orion Star Series benchtop DO meters with a stirrer jack input



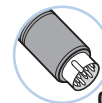
### 8 Pin Waterproof DIN

For use with any DO meter with an 8 pin waterproof DIN input



### 13 Pin DIN

For use with 862A DO meter with a 13 pin DIN DO/stirrer jack input



See page 42 for a complete offering of accessories.

# 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<sup>-1</sup> and a variety of probe materials including epoxy/graphite, glass/platinum, and stainless steel.

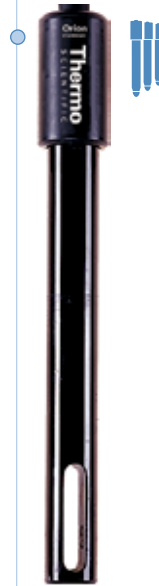
## DuraProbe™ 4-Electrode Conductivity Cells

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<sup>-1</sup> cell constant are ideal for low ionic strength solutions, de-ionized 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**



013005A<sup>F</sup> / 013010A<sup>F</sup> / 013005D<sup>B</sup> / 013010D<sup>B</sup> / 013005MD<sup>A</sup> / 013010MD<sup>A</sup> / 013025MD<sup>A</sup>

- 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**



013610<sup>F</sup> / 013660<sup>F</sup> / 013605MD<sup>A</sup> / 013610MD<sup>A</sup>

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

**2-electrode conductivity cell for ultra-pure water**



013016A<sup>F</sup> / 013016D<sup>B</sup> / 013016MD<sup>A</sup>

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

## Recommended Accessories

Cat. No.	Conductivity Solution
011001	Conditioning solution for 011050, 011050A, and 011050MD cond. cells
011008	100 µS/cm Cond/TDS Std., 5 x 60 mL
01100910	147 µS/cm Cond Std., 10 pouches
011007	1413 µS/cm Cond/TDS Std., 5 x 60 mL
01100710	1413 µS/cm Cond/TDS Std., 10 pouches
011006	12.9 mS/cm Cond/TDS Std., 5 x 60 mL
01100610	12.9 mS/cm Cond/TDS Std., 10 pouches
011005	111 mS/cm Cond Std., 5 x 60 mL
01100510	111 mS/cm Cond Std., 10 pouches
990106	0.1 M KCl Cond Std., 457 mL

See page 42 for a complete list of Conductivity accessories

## Key Information

2). BNC connector for conductivity meters A). MiniDIN connector B). 8 Pin DIN connector F). 8 Pin Waterproof DIN connector H). 2.5 mm Phono Jack connector

\* Conductivity cell does not have temperature compensation

\*\* 3-Electrode Conductivity Cell

**Platinized 2-electrode conductivity cell**



011020<sup>B</sup> / 011020A<sup>F</sup> / 9902BN<sup>2</sup>

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

**Chemical resistant 2-electrode conductivity cell**



011010<sup>B</sup> / 011010A<sup>F</sup>

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

**Precise 2-electrode conductivity cell**



011050<sup>B</sup> / 011050A<sup>F</sup> / 011050MD<sup>A</sup>

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

**Rugged 2-electrode conductivity cell**



011510<sup>B</sup> / 011510MD<sup>A</sup>

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

**High range 2-electrode conductivity cell**



018020MD<sup>A\*</sup>

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

**Chemical resistant 3-electrode conductivity cell**



014005<sup>2,H\*\*</sup>

- Rugged epoxy/stainless steel
- Removable guard



2



A



B



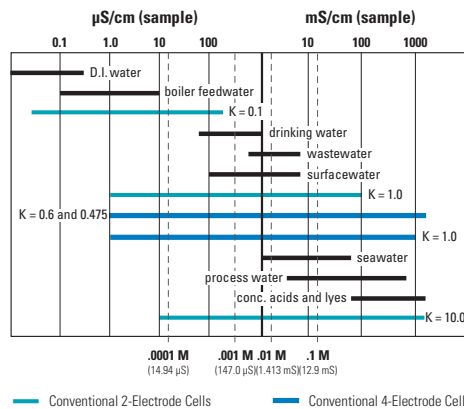
F



H

**Water Quality Specialist Tip**

**Sample Conductivity Range**



# Thermo Scientific Orion Conductivity Cell Selection Guide

## 4-Electrode Conductivity Cells

Cat. No.	Cable Length	Meter Compatibility	Measurement Range	Application
013005A <sup>F</sup> 013010A <sup>F</sup>	1.5 m 3 m	1230, 555A, 550A, 550, 162A, 162, 142, 136S, 135A, 131S, 130A, 128	1 µS/cm to 200 mS/cm	Lab and Field
013005D <sup>B</sup> 013010D <sup>B</sup>	1.5 m 3 m	150Aplus, 125Aplus		
013005MD <sup>A</sup> 013010MD <sup>A</sup> 013025MD <sup>A</sup>	1.5 m 3 m 10 m	Star Series		
013610 <sup>F</sup> 013660 <sup>F</sup>	3 m 20 m	555A, 550A, 162A, 136S, 135A, 131S, 130A	10 µS/cm to 200 mS/cm	Lab and Field
013605MD <sup>A</sup> 013610MD <sup>A</sup>	1.5 m 3 m	Star Series		

## 2-Electrode Conductivity Cells

Cat. No.	Cable Length	Meter Compatibility	Measurement Range	Application
013016A <sup>F</sup>	1 m	555A, 550A, 162A, 136S, 135A, 131S, 130A	0.01 µS/cm to 300 µS/cm	Boiler feed water, ultra-pure water Includes flow cell
013016D <sup>B</sup>	1 m	150Aplus, 145Aplus, 125Aplus, 115Aplus, 105Aplus		
013016MD <sup>A</sup>	1.5 m	Star Series		
011020 <sup>B</sup>	1 m	150Aplus, 145Aplus, 125Aplus, 115Aplus, 105Aplus	0.1 µS/cm to 100 µS/cm	Boiler feed water, ultra-pure water
011020A <sup>F</sup>	1 m	555A, 550A, 162A, 136S, 135A, 131S, 130A		
9902BN <sup>2</sup>	1 m	Conductivity meters with BNC connection		
011010 <sup>B</sup>	1 m	150Aplus, 145Aplus, 125Aplus, 115Aplus, 105Aplus	1 µS/cm to 200 mS/cm	Lab
011010A <sup>F</sup>	1 m	555A, 550A, 162A, 136S, 135A, 131S, 130A		
011050 <sup>B</sup>	1 m	150Aplus, 145Aplus, 125Aplus, 115Aplus, 105Aplus	1 µS/cm to 20 mS/cm	Lab and Field
011050A <sup>F</sup>	1 m	555A, 550A, 162A, 136S, 135A, 131S, 130A		
011050MD <sup>A</sup>	1.5 m	Star Series		
011510 <sup>B</sup>	3 m	150Aplus, 145Aplus, 125Aplus, 115Aplus, 105Aplus	10 µS/cm to 200 mS/cm	Lab and Field
011510MD <sup>A</sup>	3 m	Star Series		
018020MD <sup>A*</sup>	1.5 m	Star Series	10 µS/cm to 2000 mS/cm	High electrolyte concentrations, acids, lyes, industrial process water, sea water
014005 <sup>2,H**</sup>	1 m	RL060C	0 µS/cm to 200 mS/cm	Field

### Key Information

\* Conductivity cell does not have temperature compensation

\*\*3-Electrode Conductivity Cell



Approximate Cell Constant	Cell Material	Dimensions	Min/Max Immersion
0.475 cm <sup>-1</sup>	Epoxy/Graphite	Dia - 15 mm Length - 163 mm	35/NA mm
0.55 cm <sup>-1</sup>	Epoxy/Graphite	Dia - 12 mm Length - 163 mm	35/NA mm

Approximate Cell Constant	Cell Material	Dimensions	Min/Max Immersion
0.1 cm <sup>-1</sup>	Steel, V4A	Dia - 13 mm Length - 120 mm Flow Cell Volume 8-12 mL	35/110 mm
0.1 cm <sup>-1</sup>	Glass/Platinum, platinized	Tip Dia - 17 mm Tip Length - 22 mm Dia - 13 mm Length - 120 mm	25/120 mm
1.0 cm <sup>-1</sup>	Glass/Platinum, Platinized	Dia - 13 mm Length - 120 mm	25/120 mm
1.0 cm <sup>-1</sup>	Epoxy/Platinum, Platinized	Dia - 12 mm Length - 100 mm	20/90 mm
1.0 cm <sup>-1</sup>	Epoxy/Graphite	Dia - 18 mm Length - 134 mm	35/NA mm
10 cm <sup>-1</sup>	Glass/Platinum, Platinized	Dia - 20 mm Length - 120 mm	55/110 mm
1.0 cm <sup>-1</sup>	Epoxy/Steel	Dia - 13 mm Length - 120 mm	25/120 mm

## Connector Reference

### BNC

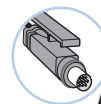
For use with conductivity meters with a BNC input



2

### MiniDIN

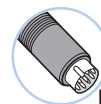
Ensures a waterproof and secure connection when used with Orion Star Series conductivity meters



A

### 8 Pin DIN

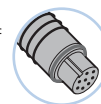
For use with any conductivity meter with an 8 pin DIN input



B

### 8 Pin Waterproof DIN

For use with any conductivity meter with an 8 pin waterproof DIN conductivity input



F

### 2.5 mm Phono Tip

For use with Russell RL060C meter with a 2.5 mm phono tip input



H

## Recommended Accessories

### Cat. No. Conductivity Calibration Kits

**1010001<sup>A</sup>** Conductivity calibration resistor kit for Orion Star Series conductivity meters

**011220<sup>B</sup>** Conductivity calibration resistor kit for 105Aplus, 115Aplus, 125Aplus, 145Aplus, and 150Aplus meters

**011221<sup>F</sup>** Conductivity calibration resistor kit for 130A, 131S, 135A, 136S, 162A, 550A, and 555A meters

See page 42 for a complete offering of accessories.

Visit [www.thermo.com/water](http://www.thermo.com/water) for information on Russell meters.

# Thermo Scientific Orion Buffers, Solutions and Accessories



## For all your electrochemistry measurement needs

The quality of your analytical results depends upon the quality of your standards, buffers and reagents. We offer a complete selection of quality-assured support solutions for virtually any electrochemistry analysis. Our pH buffers are designed to meet all end user requirements, including laboratory




grade and DIN standards. Buffer temperature tables are programmed into the meter software for use with the Auto-Buffer-Recognition feature.

To maximize the life of your electrodes, we offer pH electrode cleaning kits as well as storage and rinse solutions for proper electrode care.

### pH Electrode Filling Solutions (All are 5 x 60 mL bottles)

Cat. No.	Description	For the Following pH Electrodes:
810007	3 M KCl	<b>ROSS Ultra, ROSS and PerpHecT ROSS Electrodes</b> — 800500U, 8102BNUWP, 8103BNUWP, 8104BNUWP, 8115BNUWP, 8135BNUWP, 8156BNUWP, 800300, 800500, 8102, 8103, 8104, 8115, 8135, 8155, 815600, 8162SC, 8163, 8165BNUWP, 8166SC, 8172, 8175BNUWP, 8202BN, 8203BN, 8220BNUWP, 8235BN, 8256BN, 8263BN, 8272BN
910008	3 M KCl	<b>Double Junction and Double Junction KNIpHE Electrodes</b> — 9102DJVWP, 9110DJVWP, 9120APWP
900011 900004	4 M KCl with Ag/AgCl or 2 M KCl with Ag/AgCl (For low ionic strength samples)	<b>Standard, Specialty, and PerpHecT Ag/AgCl Electrodes</b> — 9102, 9103, 9104, 915500, 9156, 9157, 9162, 9163SC, 9164SC, 9165BNUWP, 9166SC, 9167SC, 9172BNUWP, 9202BN, 9203BN, 9256BN, 9272BN, 900400
900011	4 M KCl with Ag/AgCl	<b>Micro pH Electrodes</b> — 9802BN, 9803BN, 9810BN, 9826BN, 9863BN
900011	4 M KCl with Ag/AgCl	<b>ORP Electrodes</b> — 9180, 9678, 9778
900019	Viscous 3 M KCl	<b>Steam Sterilizable Electrodes</b> — 9190SC, 9191SC, 919200, 9193SC, 919400, 9195SC
900014	4 M KCl	<b>TRIS Calomel and TRIS Calomel KNIpHE Electrodes</b> — 7102BN, 7103BN, 7110BN, 7120BN
610011	3 M KCl with Ag/AgCl	<b>pHuture pH Electrodes</b> — 616500, 616600, 617900
900001	Equitransferent Solution with Ag/AgCl	<b>Single Junction Sure-Flow Reference Electrode</b> — 900100
900002 900003	Inner Chamber— Equitransferent Solution with Ag/AgCl Outer Chamber— 10% KNO <sub>3</sub>	<b>Double Junction Sure-Flow Reference Electrode</b> — 900200
510011	No Cal Electrode Filling Solution	<b>No Cal pH Electrodes</b> — 5107NC, 5107BNMD, 5109NC

### pH Electrode Cleaning and Storage Solutions

Cat. No.	Description
910001 910060 9100CB	<b>pH Electrode Storage Solution</b> — 475 mL 5 x 60 mL 19 L (5 gallon) cubitainer
810001	<b>ROSS pH Electrode Storage Solution</b> — Optimize ROSS Ultra pH electrode performance and life, 475 mL
911110 911125	<b>pH Rinse Solution</b> — PerpHecT Individual Rinse Pouch 10 pack 25 pack
900020	 <b>pH Electrode Cleaning Solutions— pH Cleaning Solution Kit</b> — Includes 1 x 15 mL each of cleaning solutions A, B, C and D, beaker and pipette
900021	 <b>pH Cleaning Solution A</b> — For removing protein contaminants. Includes 4 x 15 mL bottles, beaker and pipette
900022	<b>pH Cleaning Solution B</b> — For removing bacterial contaminants. Includes 4 x 15 mL bottles, beaker and pipette
900023	 <b>pH Cleaning Solution C</b> — For general cleaning. Includes 4 x 15 mL bottles, beaker and pipette
900024	<b>pH Cleaning Solution D</b> — For removing oil and grease contaminants. Includes 4 x 15 mL bottles, beaker and pipette

### pH Electrode Accessories

Cat. No.	Description
910005	Bulb Guard for glass pH electrode, 5 pack
900060	ionplus Stirring Accessory
910003	12 mm Electrode Storage Bottles, 3 pack
910004	8 mm Electrode Storage Bottles, 3 pack
910006	6 mm Electrode Storage Bottles, 3 pack
020017	No Cal Electrode Storage Chamber

### ORP Standards

Cat. No.	Description
967901	475 mL
967961	5 x 60 mL

## pH Testing Kits

Cat. No.	Description
700001	<b>Pure Water pH Test Kit</b> – pH 6.97 buffer, 4 x 475 mL (700702); pH 4.10 buffer, 4 x 475 mL (700402); pHISA adjuster, 2 x 50 mL (700003); Application Procedure No. 501 “pH Measurement in Low Ionic Strength Solutions”
700702	<b>Pure Water pH 6.97 Buffer A</b> – 4 x 475 mL
700402	<b>Pure Water pH 4.10 Buffer B</b> – 4 x 475 mL
700902	<b>Pure Water pH 9.15 Buffer C</b> – 4 x 475 mL
700003	<b>pHISA Pure Water Ionic Strength Adjuster</b> – 5 x 60 mL; one syringe dispenser
700010	<b>Total Alkalinity Test Kit</b> – Alkalinity reagent, 475 mL (700011); Alkalinity standard/control, 475 mL (700012); Total alkalinity conversion chart; Application Procedure No. 517 “Total Alkalinity in Natural Waters”

## pH Buffers

Cat. No.	Description
910199	<b>All-in-One pH Buffer Kit</b> – 475 mL bottle each of 4.01, 7.00, 10.01 buffers and pH electrode storage solution (910001), pH electrode storage bottle
910168 9116860	<b>pH 1.68 Buffer</b> – 475 mL 5 x 60 mL
910104 910460 9104CB 910410	<b>pH 4.01 Buffer (red)</b> – 475 mL 5 x 60 mL 19 L (5 gallon) cubitainer PerpHecT Individual Buffer Pouch, 10 pack PerpHecT Individual Buffer Pouch, 25 pack
910425	<b>pH 5.00 Buffer (orange)</b> – 475 mL
910105	<b>pH 6.86 Buffer</b> – 475 mL 5 x 60 mL
910686 916860	<b>pH 7.00 Buffer (yellow)</b> – 475 mL 5 x 60 mL 19 L (5 gallon) cubitainer PerpHecT Individual Buffer Pouch, 10 pack PerpHecT Individual Buffer Pouch, 25 pack
910710	<b>pH 9.18 Buffer</b> – 475 mL (1 pint) 5 x 60 mL
910918 9191860	<b>pH 12.46 Buffer</b> – 475 mL 5 x 60 mL
910110 911060 9110CB 911010	<b>pH 12.01 Buffer (blue)</b> – 475 mL 5 x 60 mL 19 L (5 gallon) cubitainer PerpHecT Individual Buffer Pouch, 10 pack PerpHecT Individual Buffer Pouch, 25 pack
910112 911260	<b>pH 12.46 Buffer</b> – 475 mL 5 x 60 mL

## ISE Calibration Standards

Cat. No.	Description
All are 475 mL bottles unless noted	
951006 951207 951007	<b>Ammonia</b> – 0.1 M NH <sub>4</sub> Cl 100 ppm as N 1000 ppm as N
943506	<b>Bromide</b> – 0.1 M NaBr
922006	<b>Calcium</b> – 0.1 M CaCl <sub>2</sub>
950206 950207	<b>Carbon Dioxide</b> – 0.1 M NaHCO <sub>3</sub> 1000 ppm as CaCO <sub>3</sub>
941706 941707 941708	<b>Chloride</b> – 0.1 M NaCl 100 ppm as Cl <sup>-</sup> 1000 ppm as Cl <sup>-</sup>
977007	<b>Chlorine</b> – 100 ppm as Cl <sub>2</sub>
942906	<b>Cupric</b> – 0.1 M Cu(NO <sub>3</sub> ) <sub>2</sub>
940906 940907 040906 040907 040908 940916	<b>Fluoride</b> – 0.1 M NaF 100 ppm as F <sup>-</sup> 1 ppm as F <sup>-</sup> with TISAB II 2 ppm as F <sup>-</sup> with TISAB II 10 ppm as F <sup>-</sup> with TISAB II Bulk Pack– 4 x 475 mL each of 1 ppm as F <sup>-</sup> with TISAB II (040906) and 10 ppm as F <sup>-</sup> with TISAB II (040908)
945306	<b>Iodide</b> – 0.1 M NaI
948206 948207	<b>Lead</b> – 0.1 M Pb(ClO <sub>4</sub> ) <sub>2</sub> Lead 0.1 M Na <sub>2</sub> SO <sub>4</sub> Sulfate
920706 930707 920707	<b>Nitrate</b> – 0.1 M NaNO <sub>3</sub> 100 ppm as N 1000 ppm as N
954606	<b>Nitrite and Nitrogen Oxide</b> – 0.1 M NaNO <sub>2</sub>
921906	<b>Potassium</b> – 0.1 M KCl
941104 941706 941105 941107 841108 841109	<b>Sodium</b> – 5% NaCl 0.1 M NaCl 10 ppm as Na <sup>+</sup> 100 ppm as Na <sup>+</sup> 1000 ppm as Na <sup>+</sup> Known Addition Standard, 1000 ppm as Na <sup>+</sup> with ISA Know Addition Kit– 3 x 475 mL of 1 M NaCl with ISA and 1 x 475 mL ISA (841111)
650700	<b>Surfactant</b> – 0.05 M Hyamine 0.01 M Sodium Lauryl Sulfate (SLS), 60 mL
654201 654202	<b>Surfactant</b> – 0.05 M Hyamine 0.01 M Sodium Lauryl Sulfate (SLS), 60 mL
923206 922006	<b>Water Hardness</b> – 100 ppm as CaCO <sub>3</sub> 0.1 M CaCl <sub>2</sub>

## ISE Ionic Strength Adjusters (ISA) and Special Reagents

Cat. No.	Description
All are 475 mL bottles unless noted	
951211	<b>Ammonia</b> – pH Adjusting ISA
700005	<b>Nitrate Analysis Test Kit for Ammonia Electrode</b> – Alkaline Reagent (951011); Reducing Reagent (700006); Electrode Filling Solution, 2 x 50 mL (951203); 100 ppm as N Nitrate Standard (930707); 100 ppm Ammonia Standard (951207); Application Procedure No. 115 “Nitrate Measurement in Environmental Samples”
700006	<b>Nitrate Analysis Test Kit</b> – Reducing Agent
940011	<b>Bromide, Cadmium, Chloride, Cupric, Iodide, Silver, Thiocyanate</b> – ISA
932011	<b>Calcium</b> – ISA
950210	<b>Carbon Dioxide</b> – ISA
941709	<b>Chloride</b> – Complexation Ionic Strength Adjuster (CISA) Reagent Pack, 2 x 475 mL
977011 977010	<b>Chlorine</b> – Acid Reagent Iodide Reagent
951011	<b>Cyanide</b> – Alkaline Reagent, 10 M NaOH
940909 940999 940911	<b>Fluoride</b> – TISAB II 1 gallon, 3.8 L TISAB II 4 gallon, 4 x 3.8 L TISAB III Concentrate
930711	<b>Fluoroborate, Nitrate, and Perchlorate</b> – ISA
930710	<b>Nitrate</b> – Nitrate Interference Suppressor Solution (NISS)
934610	<b>Nitrite</b> – ISA
956410	<b>Nitrogen Oxide</b> – Acid Buffer
931911	<b>Potassium</b> – ISA
941609	<b>Sulfide</b> – Sulfide Anti-Oxidant Buffer (SAOB) Reagent Pack, 4 x 475 mL
841111 841113 841101	<b>Sodium</b> – ISA Reconditioning Solution Storage Solution
654203 654204 654205	<b>Surfactant</b> – Sample Additive Non-Ionic Surfactant Reagent Non-Ionic Surfactant Titrant

## ISE Filling Solutions

Cat. No.	Description
All are 5 x 60 mL bottles unless noted	
951202	Ammonia, 1 x 60 mL
900018	Ammonium
950202	Carbon Dioxide, 1 x 60 mL
900017	Chloride
900001	Fluoride
954602	Nitrogen Oxide, 1 x 50 mL
900061	<b>ionplus Series– Optimum Results A</b> – Cadmium, Calcium, Fluoride, Sulfide
900062	<b>Optimum Results B</b> – Chloride, Cyanide, Lead, Silver/Sulfide
900067	<b>Optimum Results C</b> – Silver
900063	<b>Optimum Results D</b> – Bromide, Cupric, Iodide
900065	<b>Optimum Results E</b> – Potassium
900046	<b>Optimum Results F</b> – Nitrate, Nitrite

# Thermo Scientific Orion Buffers, Solutions and Accessories

## ISE Filling Solutions (cont'd)

Cat. No.	Description
	All are 5 x 60 mL bottles unless noted
900002 900003	<b>Double Junction Reference</b> – Inner Filling Solution Outer Filling Solution
900010 900012	<b>Sodium</b> – 2 M NH <sub>4</sub> Cl 0.1 M NH <sub>4</sub> Cl for low sodium levels
900004	<b>Sodium</b> – Micro Electrode

## ISE Membranes and Modules

Cat. No.	Description
951204 951205	<b>9512 Ammonia</b> – 20 Loose Membranes 3 Bonded Membranes
950204	<b>Carbon Dioxide</b> – 4 Membranes with O-rings
954604	<b>Nitrogen Oxide</b> – 20 Loose Membranes
931801 932001 931701 930501 930702 930701 934601 938101 930101 931901 933201	<b>Plastic Membrane Half-Cell Modules</b> – Ammonium Calcium Chloride Fluoroborate Nitrate Nitrate– 3 Pack Nitrite Perchlorate pH – HF Resistant Potassium Water Hardness
972001 970701 974601 971901	<b>Plastic Membrane Comb. Modules</b> – ionplus Calcium ionplus Nitrate ionplus Nitrite ionplus Potassium



## ISE Accessories

Cat. No.	Description
9300BNWP 930000 9300SC	<b>93 Series Handle</b> – BNC Waterproof Connector U.S. Std. Connector Screw Cap, Requires Separate Cable
9700BNWP	<b>97 Series ionplus Handle</b> – BNC Waterproof Connector
948201	Polishing Strips for Solid State Electrodes
900060	ionplus Stirring Accessory

## 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 mS/cm Conductivity Standard, 5 x 60 mL
01100510	111 mS/cm Conductivity Standard, 10 pouches
990106	0.1 M KCl Conductivity Standard, 475 mL
1010001	Conductivity calibration resistor kit for Orion Star Series conductivity meters, MiniDIN
011220	Conductivity calibration resistor kit for 105A+, 115A+, 125A+, 145A+, and 150A+ meters, 8 Pin DIN
011221	Conductivity calibration resistor kit for 130A, 131S, 135A, 136S, 162A, 550A, and 555A meters, 8 Pin Waterproof DIN
011001	Conditioning solution for 011050, 011050A, and 011050MD conductivity cells
0105PK	Platinizing Kit, includes fixture and solutions
010010	Platinizing Solution and Vessel
013017	Replacement Flow Cell for 013016A, 013016D, and 013016MD
013045	Stainless Steel Protective Probe Guard (For 013005MD, 013010MD, 013025MD, 013005A, 013010A, 013030A, 013060A, 013005D, 013010D)
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)

## DO Maintenance Kits, Membranes, Solutions, and Accessories

Cat. No.	Description	DO Probe Compatibility
080513	Maintenance Kit <sup>1</sup>	083005MD, 083010MD, 083025MD, 083060MD, 086030MD, 083005A, 083010A, 083025A, 083060A, 083005D, 086020A, 083150A, 083300A, 083010F, 081010F, 081030F
080113	Maintenance Kit <sup>1</sup>	080510MD, 081010MD, 080510, 081010
080013	Maintenance Kit <sup>2</sup>	All 820, 840, 860, 870 and 880 Series Galvanic Probes
080313	 Maintenance Kit <sup>3</sup>	All 830 and 842 Series Galvanic Probes
080413	 Maintenance Kit <sup>3</sup>	086020
080515	1 Membrane Cap	083005MD, 083010MD, 083025MD, 083060MD, 086030MD, 083005A, 083010A, 083025A, 083060A, 083005D, 086020A, 083150A, 083300A, 083010F, 081010F, 081030F
081003	3 Membrane Caps	080510MD, 081010MD, 080510, 081010
080010	1 Membrane Cap	All 820, 830, 840, 842, 860, 870 and 880 Series Galvanic Probes
080011	3 Membrane Caps	086020
970801	1 Pre-Filled Membrane Cap	970899WP, 970899, 970800
080514	Polarographic Electrolyte Solution	083005MD, 083010MD, 083025MD, 083060MD, 086030MD, 083005A, 083010A, 083025A, 083060A, 083005D, 086020A, 083150A, 083300A, 083010F, 081010F, 081030F, 080510MD, 081010MD, 080510, 081010
080314	Galvanic Electrolyte Solution	All 820, 830, 840, 842, 860, 870 and 880 Series Galvanic Probes, 086020
080017	Calibration Sleeve	All DO probes excluding AUTO-STIR probes
086021A	Calibration Chamber/Stand	086020A, 086030MD AUTO-STIR probes
080360	BOD Adapter	083005MD, 083010MD, 083025MD, 083060MD, 083005A, 083010A, 083025A, 083060A, 083005D
080160	BOD Adapter	081010MD, 081010
970802	BOD Stir Funnel	970899WP, 970899, 970800
970803	Batteries	970899WP, 970899, 970800
013045	Stainless Steel Protective Probe Guard	080510MD, 080510, 083005MD, 083010MD, 083025MD, 083060MD, 083005A, 083005D, 083010A, 083025A and 083060A
080045	Stainless Steel and Plastic Protective Probe Guard	080510MD, 080510, 083005MD, 083010MD, 083025MD, 083060MD, 083005A, 083005D, 083010A, 083025A and 083060A
081045	Plastic Protective Probe Guard	080510MD, 080510, 083005MD, 083010MD, 083025MD, 083060MD, 083005A, 083005D, 083010A, 083025A and 083060A

### Key Information

1. Electrolyte Solution, Polishing Disk, 2 Membrane Caps 2. Electrolyte Solution, Cleaning Solution, Cleaning Paper 3. Electrolyte Solution, Cleaning Solution, Cleaning Paper, 3 Membrane Caps, Pipette



Signifies a hazardous solution. See terms and conditions for important shipping information at [www.thermo.com/water](http://www.thermo.com/water).

# Thermo Scientific Orion Cables & Adapters



## Connectors that stay dry and connected

If you have ever lost data – or even 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.

Adapter Cables		
Cat. No.	Adapter Description	Meter Capabilities
1010050	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	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

## Electrode Extension Cables

Cat. No.	Description
910025	15 ft. Extension Cable, U.S. Standard connector
910026	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	15 ft. Extension Cable, 3.5 mm Phono Tip connector for 927005, 927006, and 927007 ATC probes
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

## 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
91CLFO	F LEMO (Metrohm)	Screw Cap	Detachable Cable to F LEMO Connector
090035	LEMO Miniature (Mettler)	BNC	BNC to LEMO Miniature Adapter
91CLMO	LEMO Miniature (Mettler)	Screw Cap	Detachable Cable to LEMO Connector
91CBNL	Phillips	Screw Cap	Detachable Cable to Phillips Connector
91CBBR	British (Kent EIL)	Screw Cap	Detachable Cable to British 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
91CBRA	Radiometer No. 7	Screw Cap	Detachable Cable to Radiometer Connector
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



# We Have Your Ideal Meter!

## Thermo Scientific Orion Star™ Series Meters

Results you can count on – every time.

Rugged enough for the most challenging laboratory and field applications, the Orion Star Series meters combine sophisticated technology with simplified operation and exceptional long-life performance.

### Intelligent measurement features

SMART STABILITY, SMART AVERAGING, and other automatic functions help to optimize the measurement process and ensure accurate results, even for non-technical users. You can also download software updates via the Web. Simply go to [www.thermo.com/water](http://www.thermo.com/water) and click "Upgrade your Star Series Software" under Resources.

- Automatic calibration reminders
- 1 to 5 point automatic or manual pH calibration

- Automatic recognition of NIST/US and EU/DIN buffers
- Automatic or manual temperature compensation
- 1 to 5 point manual ISE calibration, point-to-point ISE calibration, and high and low concentration range selection
- Selectable automatic blank correction for ISE measurements
- Accurate DO measurements with automatic salinity correction
- Selectable calibration to Winkler titration for BOD measurements
- Automatic barometric pressure compensation or display barometric pressure for manual calibration
- Conductivity meters utilize DuraProbe 4-electrode conductivity cells that compensate for electrode fouling, cable and connector resistance, and polarization errors

www.thermo.com/water



### Full support for 21 CFR Part 11

Star Navigator 21 data collection software assists regulatory compliance through systems validation, security and audit trails with time date stamps, documentation control, archiving and record retention and recovery.



### Export data to a PC or LIMS

Measurement data can be exported directly to a spreadsheet. It's easy to add ID numbers or comments, prepare graphs, and produce professional reports and presentations.



### Expanded range of NIST/US and EU/DIN buffers

Our pH buffers are designed to meet all end user requirements, including laboratory grade and DIN standards. Buffer temperature tables are pre-entered into the meter software for use with the Auto-Buffer-Recognition feature.

### Rugged, reliable, and designed for you

Benchtop meters are dustproof and splashproof. Portable meters are waterproof. Simple operation and consistent user interface across all meter types minimizes personnel training time. Now you and your team can spend more time sampling and analyzing, with no time worrying about your equipment.

- Bright LCD display with ready indication and convenient reference panel helps even novices gain confidence
- Record and store up to 10 password-protected setup parameters and calibrations—especially valuable for multi-user labs



#### Simple, instructive reference panel

Begin taking effective measurements quickly and efficiently. New and returning users appreciate the reference guide attached to each meter.

- AUTO-READ and hold function
- Advanced meter operation self-test and comprehensive self-diagnostics
- Universal power adapter for worldwide operation
- CE, CSA, TÜV, UL and FCC Class A limits approval
- Three-year replacement warranty

#### Safeguard your data

Take a full day's measurements, and then download to a printer or computer via the standard RS232 connection or optional USB interface. Methods and measurement parameters are stored in non-volatile memory, and will not be lost in the event of power failure or during a battery change.



#### Connectors that stay dry and stay connected

If you have ever lost data – or even an electrode – because of a failed connection, you'll appreciate Star Series' proprietary waterproof BNC and MiniDIN locking connectors. Waterproof BNC connectors are compatible with virtually any meter with BNC input.

Star Navigator 21 software (included with all 5-Star multi-parameter meters) assists your compliance with 21 CFR Part 11, FDA Regulations; it also enables meter operation through a computer keyboard.

#### Calibration/Validation and IQ/OQ options

You'll feel confident your results are accurate and exact when taking advantage of our calibration and validation options. Save time and money when you purchase the IQ/OQ package, Cat. No. STAR-IQOQ, to ensure that your meter performs to the manufacturer's published specifications. See the Service Program Options section for details.



#### Field testing efficiency

Everything you need for your analysis – meter, appropriate sensors, and required solutions such as buffers or standards – neatly packed in either a soft or hard field case.



# Thermo Scientific Orion Star™ Series Selection Guide

## Benchtop Meters

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Model	5-Star	4-Star	4-Star	4-Star	3-Star	3-Star	3-Star	2-Star
<b>Meter Parameters</b>	pH/ISE/Cond/DO	pH/ISE	pH/Cond	pH/DO	pH	Cond	DO	pH
<b>Page</b>	pg. 50 - 51	pg. 52 - 53	pg. 54 - 55	pg. 56 - 57	pg. 58 - 59	pg. 60 - 61	pg. 62 - 63	pg. 64
<b>pH, mV, Rel mV, ORP</b>	•	•	•	•	•			•
<b>Calibration Points</b>	1 to 5	1 to 5	1 to 5	1 to 5	1 to 5	--	--	1 to 3
<b>Recognized Buffers</b>	US, NIST, DIN, Custom	US, NIST, DIN, Custom	US, NIST, DIN, Custom	US, NIST, DIN, Custom	US, NIST, DIN, Custom	--	--	US, NIST, DIN, Custom
<b>Calibration Timer</b>	Yes	Yes	Yes	Yes	Yes	--	--	No
<b>Concentration (ISE)</b>	•	•						
<b>Calibration Points</b>	1 to 5	1 to 5	--	--	--	--	--	--
<b>Selectable Units</b>	M, mg/L, %, ppb, unitless	M, mg/L, %, ppb, unitless	--	--	--	--	--	--
<b>Low Concentration Stability Option</b>	Yes	Yes	--	--	--	--	--	--
<b>Autoblack Correction</b>	Yes	Yes	--	--	--	--	--	--
<b>Conductivity, TDS, Salinity, Resistivity</b>	•		•			•		
<b>Probe Type</b>	2-, 4-, and Planar Cell	--	2-, 4-, and Planar Cell	--	--	2-, 4-, and Planar Cell	--	--
<b>Calibration Auto/Direct</b>	Yes (3) / (5)	--	Yes (3) / (5)	--	--	Yes (3) / (5)	--	--
<b>Reference Temperatures</b>	15, 20 or 25 °C	--	15, 20 or 25 °C	--	--	15, 20 or 25 °C	--	--
<b>Cell Constant</b>	0.001 to 199.9	--	0.001 to 199.9	--	--	0.001 to 199.9	--	--
<b>Dissolved Oxygen, BOD</b>	•			•			•	
<b>Probe Type</b>	Polarographic	--	--	Polarographic	--	--	Polarographic	--
<b>Automatic Salinity Correction from Conductivity Probe</b>	Yes	--	--	No	--	--	No	--
<b>Barometer Auto or Manual</b>	450 to 850 mm Hg	--	--	450 to 850 mm Hg	--	--	450 to 850 mm Hg	--
<b>Calibration Methods</b>	Water Saturated Air, Air Saturated Water, Manual (Winkler), 0 pt.	--	--	Water Saturated Air, Air Saturated Water, Manual (Winkler), 0 pt.	--	--	Water Saturated Air, Air Saturated Water, Manual (Winkler), 0 pt.	--
<b>Temperature, ATC and MTC</b>	•	•	•	•	•	•	•	•
<b>Meter Features</b>								
<b>Waterproof</b>	IP54	IP54	IP54	IP54	IP54	IP54	IP54	IP54
<b>Warranty</b>	36 months	36 months	36 months	36 months	36 months	36 months	36 months	36 months
<b>LCD Display Type</b>	Simultaneous Multichannel	Single channel	Simultaneous Dual channel	Simultaneous Dual channel	Single Channel	Single Channel	Single Channel	Single Channel
<b>Backlight (on/off)</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
<b>Inputs</b>	BNC, pin tip ref, 8 pin MiniDIN Cond/ATC, 9 pin MiniDIN DO, Stirrer, RS232	BNC, pin tip ref, 8 pin ATC, Stirrer, RS232	BNC, pin tip ref, 8 pin MiniDIN Cond/ATC, Stirrer, RS232	BNC, pin tip ref, 8 pin MiniDIN ATC, 9 pin MiniDIN DO, Stirrer, RS232	BNC, pin tip ref, 8 pin MiniDIN ATC, Stirrer, RS232	8 pin MiniDIN Cond, Stirrer, RS232	9 pin MiniDIN DO, Stirrer, RS232	BNC, pin tip ref, 8 pin MiniDIN ATC, RS232
<b>Method Storage</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
<b>Navigator 21 Software</b>	Included	Optional	Optional	Optional	Optional	Optional	Optional	N/A
<b>RS232 w/ Computer or Printer Format</b>	2-way	2-way	2-way	2-way	2-way	2-way	2-way	2-way, printer format only
<b>Datalog Points</b>	200	200	200	200	200	200	200	50
<b>GLP</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
<b>Universal AC Power (110/220/240 V)</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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## Portable Meters

Model	5-Star	5-Star	4-Star	4-Star	4-Star	3-Star	3-Star	3-Star
<b>Meter Parameters</b>	pH/ISE/Cond/DO	pH/Cond/DO	pH/ISE	pH/Cond	pH/DO	pH	Cond	DO
<b>Page</b>	pg. 50 - 51	pg. 49	pg. 52 -53	pg. 54 - 55	pg. 56 -57	pg. 58 - 59	pg. 60 - 61	pg. 62 - 63
<b>pH, mV, Rel mV, ORP</b>	•	•	•	•	•	•		
<b>Calibration Points</b>	1 to 5	1 to 5	1 to 5	1 to 5	1 to 5	1 to 5	--	--
<b>Recognized Buffers</b>	US, NIST, DIN, Custom	US, NIST, DIN, Custom	US, NIST, DIN, Custom	US, NIST, DIN, Custom	US, NIST, DIN, Custom	US, NIST, DIN, Custom	--	--
<b>Calibration Timer</b>	Yes	Yes	Yes	Yes	Yes	Yes	--	--
<b>Concentration (ISE)</b>	•		•					
<b>Calibration Points</b>	1 to 5	--	1 to 5	--	--	--	--	--
<b>Selectable Units</b>	M, mg/L, %, ppb, unitless	--	M, mg/L, %, ppb, unitless	--	--	--	--	--
<b>Low Concentration Stability Option</b>	Yes	--	Yes	--	--	--	--	--
<b>Autoblack Correction</b>	Yes	--	Yes	--	--	--	--	--
<b>Conductivity, TDS, Salinity, Resistivity</b>	•	•		•			•	
<b>Probe Type</b>	2-, 4-, and Planar Cell	2-, 4-, and Planar Cell	--	2-, 4-, and Planar Cell	--	--	2-, 4-, and Planar Cell	--
<b>Calibration Auto/Direct</b>	Yes (3) / (5)	Yes (3) / (5)	--	Yes (3) / (5)	--	--	Yes (3) / (5)	--
<b>Reference Temperatures</b>	15, 20 or 25 °C	15, 20 or 25 °C	--	15, 20 or 25 °C	--	--	15, 20 or 25 °C	--
<b>Cell Constant</b>	0.001 to 199.9	0.001 to 199.9	--	0.001 to 199.9	--	--	0.001 to 199.9	--
<b>Dissolved Oxygen, BOD</b>	•	•			•			•
<b>Probe Type</b>	Polarographic	Polarographic	--	--	Polarographic	--	--	Polarographic
<b>Automatic Salinity Correction from Conductivity Probe</b>	Yes	Yes	--	--	No	--	--	No
<b>Barometer Auto or Manual</b>	450 to 850 mm Hg	450 to 850 mm Hg	--	--	450 to 850 mm Hg	--	--	450 to 850 mm Hg
<b>Calibration Methods</b>	Water Saturated Air, Air Saturated Water, Manual (Winkler), 0 pt.	Water Saturated Air, Air Saturated Water, Manual (Winkler), 0 pt.	--	--	Water Saturated Air, Air Saturated Water, Manual (Winkler), 0 pt.	--	--	Water Saturated Air, Air Saturated Water, Manual (Winkler), 0 pt.
<b>Temperature, ATC and MTC</b>	•	•	•	•	•	•	•	•
<b>Meter Features</b>								
<b>Waterproof</b>	IP67	IP67	IP67	IP67	IP67	IP67	IP67	IP67
<b>Warranty</b>	36 months	36 months	36 months	36 months	36 months	36 months	36 months	36 months
<b>LCD Display Type</b>	Simultaneous Multichannel	Simultaneous Multichannel	Single Channel	Simultaneous Dual channel	Simultaneous Dual channel	Single Channel	Single Channel	Single Channel
<b>Backlight (on/off)</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Inputs</b>	BNC, 8 pin MiniDIN Cond/ATC, 9 pin MiniDIN DO, RS232	BNC, 8 pin MiniDIN Cond/ATC, 9 pin MiniDIN DO, RS232	BNC, 8 pin MiniDIN ATC, RS232	BNC, 8 pin MiniDIN Cond/ATC, RS232	BNC, 8 pin MiniDIN ATC, 9 pin MiniDIN DO, RS232	BNC, 8 pin MiniDIN ATC, RS232	8 pin MiniDIN Cond/ATC, RS232	9 pin MiniDIN DO, RS232
<b>Method Storage</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Navigator 21 Software</b>	Included	Included	Optional	Optional	Optional	Optional	Optional	Optional
<b>RS232</b>	2-way	2-way	2-way	2-way	2-way	2-way	2-way	2-way
<b>Datalog Points</b>	200	200	200	200	200	200	200	200
<b>GLP</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Battery Life</b>	2000 hours	2000 hours	2000 hours	2000 hours	2000 hours	2000 hours	2000 hours	2000 hours

# Application Guide

## Easy-to-Use / Easy-to-Choose

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Orion Star Series kits offer the convenience of everything you need for your specific application –

- Orion Star Series Meter
- Sensors
- Standards / Buffers
- Electrode Stand and more...

Simply identify your application code from the meter application table and match to the meter you want.

### Meter Application

Code	Description
<b>FW</b>	Ideal for clean samples, fresh water and drinking water.
<b>WW</b>	Designed for dirty samples and wastewater applications.
<b>UPW</b>	Ideal for ultra pure water testing.
<b>TRIS</b>	Designed for compatibility with TRIS, proteins and sulfides.
<b>CLOG-FREE</b>	Ideal for dirty and difficult samples.
<b>USP 645</b>	Meets USP requirements for conductivity.
<b>ORP</b>	Designed for oxidation-reduction potential measurements.
<b>BOD</b>	Ideal for wastewater BOD applications.
<b>WINE</b>	Compatible with wine and beer samples.
<b>Na<sup>+</sup></b>	Designed for sodium ISE applications.
<b>NH<sub>3</sub></b>	Designed for ammonia ISE applications.
<b>F<sup>-</sup></b>	Designed for fluoride ISE applications.
<b>NO<sub>3</sub><sup>-</sup></b>	Designed for nitrate ISE applications.
<b>Cl<sup>-</sup></b>	Designed for chloride ISE applications.
<b>Ca<sup>2+</sup></b>	Designed for calcium ISE applications.



# Thermo Scientific Orion 5-Star pH/ORP/Conductivity/DO Portable Meter



**NEW**

- pH, ORP, conductivity and DO measurements in one waterproof hand-held unit
- Durable and balanced with backlit display for easy handling in the most demanding field applications
- Full complement of GLP-related features including Star Navigator 21 software
- SMART STABILITY and SMART AVERAGING functions for automatically optimized accuracy, precision and response time
- Storage of up to 10 password protected methods for easy retrieval of operation procedures
- Automatic salinity correction for DO measurements from the conductivity probe reading
- Simultaneous display of pH, conductivity, DO and temperature measurements
- Battery power delivers over 2,000 hours of continuous operation
- 3 year warranty

## Description

- IP67 waterproof and dustproof
- 4 x AA batteries, powerless data protection

## Specifications

<b>pH</b>	Range / Resolution	- 2.000 to 19.999 / 0.1, 0.01, 0.001
	Relative Accuracy	± 0.002
<b>mV</b>	Range	± 1999.9
	Resolution / Relative Accuracy	0.1 / ± 0.2 or 0.05%, whichever is greater
<b>Conductivity</b>	Range	0.000 to 3000 mS/cm, cell constant dependence
	Resolution	4 significant digits down to 0.001 µS/cm, cell constant dependent
	Relative Accuracy	0.5% ± 1 digit or 0.01 µS/cm, whichever is greater
<b>Resistivity</b>	Range / Resolution	0.0001 to 100 Megohm / Automatic
	Relative Accuracy	0.5 % ± 1 digit
<b>Salinity</b>	Range / Resolution	0.01 to 80.0 ppt NaCl equivalent, 0.01 to 42 ppt practical salinity / 0.01
	Relative Accuracy	± 0.1 ± 1 digit
<b>TDS</b>	Range / Resolution	0 to 19999 / 1 mg/L
	Relative Accuracy	± 0.5 % ± 1 digit
<b>DO</b>	Concentration Range / Resolution	0.00 to 90.0 mg/L / 0.0, 0.00 mg/L
	% Saturation Range / Resolution	0.0 to 600% / 0, 0.0 %
	Concentration / % Saturation Relative Accuracy	± 0.2 mg/L / ± 2%
	Calibration Features / Probe Type	Water Saturated Air, Air Saturated Water, Manual (Winkler) and Zero Point / Polarographic
<b>Temperature</b>	Range / Resolution	- 5 to 105 °C / 0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	± 0.1 °C

## Meter Only

Cat. No.	Description
1218000	Includes meter, batteries and user's guide

## Meter Kits

Cat. No. / Application	Sensor (s)	Accessories and Solutions
1218001 / FW	<ul style="list-style-type: none"> <li>• 9107WMMD Low Maintenance Epoxy pH/ATC Triode with 3 m cable</li> <li>• 083010MD DO probe with 3 m cable and calibration sleeve</li> <li>• 013010MD DuraProbe K = 0.475 Conductivity probe with 3 m cable (1 µS/cm to 200 mS/cm)</li> </ul>	<ul style="list-style-type: none"> <li>• Meter impact jacket with electrode storage chamber</li> <li>• Beaker</li> <li>• Star Navigator 21 software with RS232 computer cable</li> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches)</li> <li>• DO probe maintenance kit - 080513</li> <li>• Protective probe guard</li> <li>• 1413 µS/cm conductivity standard (10 x 15 mL pouches)</li> <li>• Hard field case</li> </ul>
1218501 / FW	<ul style="list-style-type: none"> <li>• 9107WMMD Low Maintenance Epoxy pH/ATC Triode with 3 m cable</li> <li>• 083010MD DO probe with 3 m cable and calibration sleeve</li> <li>• 013010MD DuraProbe K = 0.475 Conductivity probe with 3 m cable (1 µS/cm to 200 mS/cm)</li> </ul>	<ul style="list-style-type: none"> <li>• Meter impact jacket with electrode storage chamber</li> <li>• Beaker</li> <li>• Star Navigator 21 software with RS232 computer cable</li> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches)</li> <li>• DO probe maintenance kit - 080513</li> <li>• Protective probe guard</li> <li>• 1413 µS/cm conductivity standard (10 x 15 mL pouches)</li> <li>• Soft field case</li> </ul>
1218101 / FW	<ul style="list-style-type: none"> <li>• 9107WMMD Low Maintenance Epoxy pH/ATC Triode with 3 m cable</li> <li>• 083010MD DO probe with 3 m cable and calibration sleeve</li> <li>• 013010MD DuraProbe K = 0.475 Conductivity probe with 3 m cable (1 µS/cm to 200 mS/cm)</li> </ul>	<ul style="list-style-type: none"> <li>• Meter impact jacket with electrode storage chamber</li> <li>• Beaker</li> <li>• Star Navigator 21 software with RS232 computer cable</li> <li>• DO probe maintenance kit - 080513</li> <li>• Protective probe guard</li> </ul>

Compliant with EPA testing method

Compliant with USP requirements

# Thermo Scientific Orion 5-Star pH/ORP/ISE/Conductivity/DO Meter



- pH, ORP, ISE, conductivity and DO measurements in a waterproof hand-held or splashproof benchtop meter
- Backlit display for easy viewing
- Full complement of GLP-related features including Star Navigator 21 software
- SMART STABILITY and SMART AVERAGING functions for automatically optimized accuracy, precision and response time
- Storage of up to 10 password protected methods for easy retrieval of operation procedures
- Automatic salinity correction for DO measurements from the conductivity probe reading
- Simultaneous display of pH or ISE, conductivity, DO and temperature measurements
- Battery power delivers over 2,000 hours of continuous operation
- 3 year warranty

## Recommended Accessories

Cat. No.	Description
810001	ROSS pH Electrode Storage Solution, 475 mL
01100710	1413 $\mu$ S/cm Cond/TDS Standard, 10 x 15 mL
080513	DO Probe Maintenance Kit for 083010MD
080113	DO Probe Maintenance Kit for 081010MD
080017	DO Calibration Sleeve
910001	pH Electrode Storage Solution, 475 mL
910199	All-in-One pH Buffer Kit

See page 40-42 for a complete list of accessories

## Specifications

<b>pH</b>	Range	- 2.000 to 19.999
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	$\pm 0.002$
<b>ISE</b>	Range	0 to 19900
	Resolution	1, 2, or 3 significant digits
	Relative Accuracy	$\pm 0.2$ mV or 0.05%, whichever is greater
	Units	M, mg/L, %, ppb, or no units
	Calibration Features	Linear point to point, non-linear selectable auto-blank, low concentration range stability
<b>mV</b>	Range	$\pm 1999.9$
	Resolution	0.1
	Relative Accuracy	$\pm 0.2$ or 0.05%, whichever is greater
<b>Conductivity</b>	Range	0.000 to 3000 mS/cm, auto resolution with cell constant dependence
	Resolution	4 significant digits down to 0.001 $\mu$ S/cm, cell constant dependent
	Relative Accuracy	0.5% $\pm 1$ digit or 0.01 $\mu$ S/cm, whichever is greater
<b>Resistivity</b>	Range	0.0001 to 100 Megohm
	Resolution	Automatic
	Relative Accuracy	0.5 % $\pm 1$ digit
<b>Salinity</b>	Range	0.01 to 80.0 ppt NaCl equivalent, 0.01 to 42 ppt practical salinity
	Resolution	0.01
	Relative Accuracy	$\pm 0.1 \pm 1$ digit
<b>TDS</b>	Range	0 to 19999
	Resolution	1 mg/L
	Relative Accuracy	$\pm 0.5$ % $\pm 1$ digit
<b>DO</b>	Concentration Range	0.00 to 90.0 mg/L
	Resolution	0.0, 0.00 mg/L
	Relative Accuracy	$\pm 0.2$ mg/L
	% Saturation Range	0.0 to 600 %
	Resolution	0, 0.0 %
	Relative Accuracy	$\pm 2$ %
	Calibration Features	Water Saturated Air, Air Saturated Water, Manual (Winkler), and Zero Point
Probe Type	Polarographic	
<b>Temperature</b>	Range	- 5 to 105 °C
	Resolution	0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	$\pm 0.1$ °C

**EPA** Compliant with EPA testing method

**USP** Compliant with USP requirements

Visit [www.thermo.com/water](http://www.thermo.com/water) for USP Electrode Application Notes.



## Portable Meter



### Description

- IP67 waterproof and dustproof
- 4 x AA batteries, powerless data protection

### Meter Only

Cat. No.	Package
1219000	Includes meter, batteries and user's guide

### Meter Kits

Cat. No. / Application	Sensor (s)	Accessories and Solutions
1219001 / FW	<ul style="list-style-type: none"> <li>• 9107WMMD Low Maintenance Epoxy pH/ATC Triode with 3 m cable</li> <li>• 083010MD DO probe with 3 m cable and calibration sleeve</li> <li>• 013010MD DuraProbe K = 0.475 Conductivity probe with 3 m cable (1 <math>\mu</math>S/cm to 200 mS/cm)</li> </ul>	<ul style="list-style-type: none"> <li>• Beaker</li> <li>• Meter impact jacket with electrode storage chamber</li> <li>• Star Navigator 21 software with RS232 computer cable</li> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches)</li> <li>• Protective probe guard</li> <li>• DO probe maintenance kit - 080513</li> <li>• 1413 <math>\mu</math>S/cm conductivity standard (10 x 15 mL pouches)</li> <li>• Hard field case</li> </ul>
1219501 / FW	<ul style="list-style-type: none"> <li>• 9107WMMD Low Maintenance Epoxy pH/ATC Triode with 3 m cable</li> <li>• 083010MD DO probe with 3 m cable and calibration sleeve</li> <li>• 013010MD DuraProbe K = 0.475 Conductivity probe with 3 m cable (1 <math>\mu</math>S/cm to 200 mS/cm)</li> </ul>	<ul style="list-style-type: none"> <li>• Beaker</li> <li>• Meter impact jacket with electrode storage chamber</li> <li>• Star Navigator 21 software with RS232 computer cable</li> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches)</li> <li>• Protective probe guard</li> <li>• DO probe maintenance kit - 080513</li> <li>• 1413 <math>\mu</math>S/cm conductivity standard (10 x 15 mL pouches)</li> <li>• Soft field case</li> </ul>
1219101 / FW	<ul style="list-style-type: none"> <li>• 9107WMMD Low Maintenance Epoxy pH/ATC Triode with 3 m cable</li> <li>• 083010MD DO probe with 3 m cable and calibration sleeve</li> <li>• 013010MD DuraProbe K = 0.475 Conductivity probe with 3 m cable (1 <math>\mu</math>S/cm to 200 mS/cm)</li> </ul>	<ul style="list-style-type: none"> <li>• Meter impact jacket with electrode storage chamber</li> <li>• Star Navigator 21 software with RS232 computer cable</li> <li>• DO probe maintenance kit - 080513</li> </ul>

## Benchtop Meter



### Description

- Stirrer and DO AUTO-STIR probe control
- IP54 splashproof and dustproof
- Universal power adapter and battery power, 4 x AA batteries

### Meter Only

Cat. No.	Package
1119000	Includes meter, universal power and user's guide

### Meter Kits

Cat. No. / Application	Sensor (s)	Accessories and Solutions
1119001 / TRIS FW	<ul style="list-style-type: none"> <li>• 8102BNUWP ROSS Ultra Refillable Glass pH Electrode</li> <li>• 927005MD Epoxy ATC</li> <li>• 081010MD DO probe with 3 m cable</li> <li>• 013605MD DuraProbe K = 0.55 Conductivity probe (10 <math>\mu</math>S/cm to 200 mS/cm)</li> </ul>	<ul style="list-style-type: none"> <li>• Star Navigator 21 software with RS232 computer cable</li> <li>• Swing arm electrode stand</li> <li>• pH 4.01, 7.00, and 10.01 buffers and pH electrode storage solution (pint bottles)</li> <li>• DO calibration sleeve</li> <li>• BOD reservoir, stirrer, and adapter</li> <li>• DO probe maintenance kit - 080113</li> <li>• 1413 <math>\mu</math>S/cm conductivity standard (5 x 60 mL bottles)</li> </ul>
1010152 / USP 645 TRIS FW	<ul style="list-style-type: none"> <li>• 8102BNUWP ROSS Ultra Refillable Glass pH Electrode</li> <li>• 013016MD K = 0.1 Conductivity probe (0.01 <math>\mu</math>S/cm to 300 <math>\mu</math>S/cm) with flow cell</li> <li>• Stirrer probe</li> </ul>	<ul style="list-style-type: none"> <li>• Conductivity calibration resistor kit</li> <li>• Star Navigator 21 software with RS232 computer cable</li> <li>• Swing arm electrode stand</li> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• ROSS electrode filling solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, and 10.01 buffers (pint bottles)</li> <li>• 100 <math>\mu</math>S/cm conductivity standard (5 x 60 mL bottles)</li> <li>• Method Note - Water Conductivity USP 645</li> </ul>
1119201 / TRIS FW	<ul style="list-style-type: none"> <li>• 8102BNUWP ROSS Ultra Refillable Glass pH Electrode</li> <li>• 927005MD Epoxy ATC</li> <li>• 081010MD DO probe with 3 m cable</li> <li>• 013005MD DuraProbe K = 0.475 Conductivity probe (1 <math>\mu</math>S/cm to 200 mS/cm)</li> </ul>	<ul style="list-style-type: none"> <li>• Star Navigator 21 software with RS232 computer cable</li> <li>• Swing arm electrode stand</li> <li>• DO calibration sleeve</li> <li>• BOD reservoir, stirrer, and adapter</li> <li>• DO probe maintenance kit - 080113</li> </ul>
1010113 / WW	<ul style="list-style-type: none"> <li>• 9616BNWP Silver/Sulfide Ion Selective Electrode</li> <li>• 096019 Stirrer Probe</li> </ul>	<ul style="list-style-type: none"> <li>• Star Navigator 21 software with RS232 computer cable</li> <li>• SAOB reagent pack</li> <li>• Swing arm electrode stand</li> <li>• Optimum Results A electrode fill solution</li> <li>• Method Note - Sulfide in Wastewater</li> </ul>



# Thermo Scientific Orion 4-Star pH/ISE Meter

EPA



- pH, ISE and temperature measurements in a waterproof hand-held or splashproof benchtop meter
- Backlit display for easy viewing
- SMART STABILITY and SMART AVERAGING functions for automatically optimized accuracy, precision and response time
- Storage of up to 10 password protected methods for easy retrieval of operation procedures
- Simultaneous display of pH or ISE and temperature measurements
- Battery power delivers over 2,000 hours of continuous operation
- 3 year warranty

## Recommended Accessories

Cat. No.	Description
910001	pH Electrode Storage Solution, 475 mL
910199	All-in-One pH Buffer Kit
951006	0.1 M NH <sub>4</sub> Cl, 475 mL
951207	100 ppm as N, 475 mL
951007	1000 ppm as N, 475 mL
922006	0.1 M CaCl <sub>2</sub> , 475 mL
977007	100 ppm as Cl <sub>2</sub> , 475 mL
941706	0.1 M NaCl, 475 mL
941707	100 ppm as Cl <sup>-</sup> , 475 mL
941708	1000 ppm as Cl <sup>-</sup> , 475 mL
940906	0.1 M NaF, 475 mL
940907	100 ppm as F, 475 mL
040906	1 ppm as F <sup>-</sup> with TISAB II, 475 mL
040907	2 ppm as F <sup>-</sup> with TISAB II, 475 mL
040908	10 ppm as F <sup>-</sup> with TISAB II, 475 mL
920706	0.1 M NaNO <sub>3</sub> , 475 mL
930707	100 ppm as N, 475 mL
920707	1000 ppm as N, 475 mL

See page 40-42 for a complete list of accessories

## Specifications

<b>pH</b>	Range	- 2.000 to 19.999
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	± 0.002
<b>ISE</b>	Range	0 to 19900
	Resolution	1, 2, or 3 significant digits
	Relative Accuracy	± 0.2 mV or 0.05%, whichever is greater
	Units	M, mg/L, %, ppb, or no units
	Calibration Features	Linear point to point, non-linear selectable auto-blank, low concentration range stability
<b>mV</b>	Range	± 1999.9
	Resolution	0.1
	Relative Accuracy	± 0.2 or 0.05%, whichever is greater
<b>Temperature</b>	Range	- 5 to 105 °C
	Resolution	0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	± 0.1 °C





## Portable Meter



### Description

- IP67 waterproof and dustproof
- 4 x AA batteries, powerless data protection

### Meter Only

Cat. No.	Package
1215000	Includes meter, batteries and user's guide

### Meter Kits

Cat. No. / Application	Sensor (s)	Accessories and Solutions
1215001 / FW	<ul style="list-style-type: none"> <li>• 9107BNMD Low Maintenance Epoxy pH/ATC Triode with 1.5 m cable</li> </ul>	<ul style="list-style-type: none"> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches)</li> <li>• Hard field case</li> </ul>
1215501 / FW	<ul style="list-style-type: none"> <li>• 9107BNMD Low Maintenance Epoxy pH/ATC Triode with 1.5 m cable</li> </ul>	<ul style="list-style-type: none"> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches)</li> <li>• Soft field case</li> </ul>

 Signifies a hazardous solution. See terms and conditions for important shipping information at [www.thermo.com/water](http://www.thermo.com/water).

## Benchtop Meter





### Description

- Stirrer probe control
- IP54 splashproof and dustproof
- Universal power adapter and battery power, 4 x AA batteries

### Meter Only

Cat. No.	Package
1115000	Includes meter, universal power and user's guide

### Meter Kits

Cat. No. / Application	Sensor (s)	Accessories and Solutions
1115001 / TRIS FW	<ul style="list-style-type: none"> <li>• 8102BNUWP ROSS Ultra Refillable Glass pH Electrode</li> <li>• 927005MD Epoxy ATC</li> </ul>	<ul style="list-style-type: none"> <li>• Swing arm electrode stand</li> <li>• pH 4.01, 7.00, and 10.01 buffers and pH electrode storage solution (pint bottles)</li> </ul>
1115002 / CLOG-FREE WW	<ul style="list-style-type: none"> <li>• 9172BNWP Sure-Flow Refillable Glass pH Electrode</li> <li>• 927005MD Epoxy ATC</li> </ul>	<ul style="list-style-type: none"> <li>• Swing arm electrode stand</li> <li>• pH 4.01, 7.00, and 10.01 buffers and pH electrode storage solution (pint bottles)</li> </ul>
1115003 / TRIS FW	<ul style="list-style-type: none"> <li>• 8102BNUWP ROSS Ultra Refillable Glass pH Electrode</li> <li>• 927005MD Epoxy ATC</li> </ul>	<ul style="list-style-type: none"> <li>• Star Navigator 21 software and RS232 computer cable</li> <li>• Swing arm electrode stand</li> <li>• pH 4.01, 7.00, and 10.01 buffers and pH electrode storage solution (pint bottles)</li> </ul>
1115004 / CLOG-FREE WW	<ul style="list-style-type: none"> <li>• 9172BNWP Sure-Flow Refillable Glass pH Electrode</li> <li>• 927005MD Epoxy ATC</li> </ul>	<ul style="list-style-type: none"> <li>• Star Navigator 21 software and RS232 computer cable</li> <li>• Swing arm electrode stand</li> <li>• pH 4.01, 7.00, and 10.01 buffers and pH electrode storage solution (pint bottles)</li> </ul>
1115005 / Na <sup>+</sup> CLOG-FREE	<ul style="list-style-type: none"> <li>• 8611BNWP ROSS Sodium Ion Selective Electrode</li> </ul>	<ul style="list-style-type: none"> <li>• Sodium standards and solutions (pint bottles)</li> <li>• Swing arm electrode stand</li> </ul>
1010109 / NH <sub>3</sub>	<ul style="list-style-type: none"> <li>• 9512BNWP Ammonia Ion Selective Electrode</li> <li>• Stirrer probe</li> </ul>	<ul style="list-style-type: none"> <li>• Ammonia standards and solutions (pint bottles) </li> <li>• Swing arm electrode stand</li> <li>• Method Note - Ammonia in Wastewater</li> </ul>
1010103 / F <sup>-</sup> CLOG-FREE	<ul style="list-style-type: none"> <li>• 9609BNWP Fluoride Ion Selective Electrode</li> <li>• Stirrer probe</li> </ul>	<ul style="list-style-type: none"> <li>• Fluoride standards and solutions (pint bottles)</li> <li>• Swing arm electrode stand</li> <li>• Method Note - Fluoride in Drinking Water</li> </ul>
1010108 / NO <sub>3</sub> <sup>-</sup> CLOG-FREE	<ul style="list-style-type: none"> <li>• 9707BNWP Nitrate Ion Selective Electrode</li> <li>• Stirrer probe</li> </ul>	<ul style="list-style-type: none"> <li>• Nitrate standards and solutions (pint bottles)</li> <li>• Swing arm electrode stand</li> <li>• Method Note - Nitrate in Drinking Water</li> </ul>
1010148 / Cl <sup>-</sup> CLOG-FREE	<ul style="list-style-type: none"> <li>• 9617BNWP Chloride Ion Selective Electrode</li> <li>• Stirrer probe</li> </ul>	<ul style="list-style-type: none"> <li>• Chloride standards and solutions (pint bottles)</li> <li>• Swing arm electrode stand</li> <li>• Method Note - Chloride in Snack Chips/Crisps</li> </ul>
1010102 / NH <sub>3</sub>	<ul style="list-style-type: none"> <li>• 9512BNWP Ammonia Ion Selective Electrode</li> <li>• Stirrer probe</li> </ul>	<ul style="list-style-type: none"> <li>• Ammonia standards and solutions (pint bottles) </li> <li>• Swing arm electrode stand</li> <li>• Method Note - Ammonia in Drinking Water</li> </ul>
1010134 / Ca <sup>2+</sup> CLOG-FREE	<ul style="list-style-type: none"> <li>• 9720BNWP Calcium Ion Selective Electrode</li> <li>• Stirrer probe</li> </ul>	<ul style="list-style-type: none"> <li>• Calcium standards and solutions (pint bottles)</li> <li>• Swing arm electrode stand</li> <li>• Method Note - Calcium in Milk</li> </ul>

# Thermo Scientific Orion 4-Star pH/Conductivity



- pH, conductivity and temperature measurements in a waterproof hand-held or splashproof benchtop meter
- Meets all U.S. Pharmacopeia (USP) requirements
- Compatible with 2-, 4- and planar cells
- Backlit display for easy viewing
- SMART STABILITY and SMART AVERAGING functions for automatically optimized accuracy, precision and response time
- Storage of up to 10 password protected methods for easy retrieval of operation procedures
- Simultaneous display of pH, conductivity and temperature measurements
- Battery power delivers over 2,000 hours of continuous operation
- 3 year warranty

## Recommended Accessories

Cat. No.	Description
910001	pH Electrode Storage Solution, 475 mL
910199	All-in-One pH Buffer Kit
011008	100 $\mu$ S/cm Conductivity/TDS Std, 5 x 60 mL
01100910	147 $\mu$ S/cm Conductivity Std, 10 pouches
011007	1413 $\mu$ S/cm Conductivity/TDS Std, 5 x 60 mL
01100710	1413 $\mu$ S/cm Conductivity/TDS Std, 10 pouches
011006	12.9 mS/cm Conductivity/TDS Std, 5 x 60 mL
01100610	12.9 mS/cm Conductivity/TDS Std, 10 pouches
011005	111 mS/cm Conductivity Std, 5 x 60 mL
01100510	111 mS/cm Conductivity Std, 10 pouches
990106	0.1 M KCl Conductivity Std, 475 mL

See page 40-42 for a complete list of accessories

## Specifications

<b>pH</b>	Range	- 2.000 to 19.999
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	$\pm$ 0.002
<b>mV</b>	Range	$\pm$ 1999.9
	Resolution	0.1
	Relative Accuracy	$\pm$ 0.2 or 0.05%, whichever is greater
<b>Conductivity</b>	Range	0.000 to 3000 mS/cm, auto resolution with cell constant dependence
	Resolution	4 significant digits down to 0.001 $\mu$ S/cm, cell constant dependent
	Relative Accuracy	0.5% $\pm$ 1 digit or 0.01 $\mu$ S/cm, whichever is greater
<b>Resistivity</b>	Range	0.0001 to 100 Megohm
	Resolution	Automatic
	Relative Accuracy	0.5 % $\pm$ 1 digit
<b>Salinity</b>	Range	0.01 to 80.0 ppt NaCl equivalent, 0.01 to 42 ppt practical salinity
	Resolution	0.01
	Relative Accuracy	$\pm$ 0.1 $\pm$ 1 digit
<b>TDS</b>	Range	0 to 19999
	Resolution	1 mg/L
	Relative Accuracy	$\pm$ 0.5 % $\pm$ 1 digit
<b>Temperature</b>	Range	- 5 to 105 °C
	Resolution	0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	$\pm$ 0.1 °C

**EPA** Compliant with EPA testing method

**USP** Compliant with USP requirements

Visit [www.thermo.com/water](http://www.thermo.com/water) for USP Electrode Application Notes.



## Portable Meter



### Description

- IP67 waterproof and dustproof
- 4 x AA batteries, powerless data protection

### Meter Only

Cat. No.	Package
1217000	Includes meter, batteries and user's guide

### Meter Kits

Cat. No. / Application	Sensor (s)	Accessories and Solutions
1217001 / FW	<ul style="list-style-type: none"> <li>• 9107BNMD Low Maintenance Epoxy pH/ATC Triode</li> <li>• 013005MD DuraProbe K = 0.475 Conductivity probe (1 <math>\mu</math>S/cm to 200 mS/cm)</li> </ul>	<ul style="list-style-type: none"> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches)</li> <li>• 1413 <math>\mu</math>S/cm conductivity standard (10 x 15 mL pouches)</li> <li>• Hard field case</li> </ul>
1217002 / FW	<ul style="list-style-type: none"> <li>• 9107WMMD Low Maintenance Epoxy pH/ATC Triode with 3 m cable</li> <li>• 013010MD DuraProbe K = 0.475 Conductivity probe with 3 m probe (1 <math>\mu</math>S/cm to 200 mS/cm)</li> </ul>	<ul style="list-style-type: none"> <li>• Beaker</li> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches)</li> <li>• 1413 <math>\mu</math>S/cm conductivity standard (10 x 15 mL pouches)</li> <li>• Hard field case</li> </ul>
1217501 / FW	<ul style="list-style-type: none"> <li>• 9107BNMD Low Maintenance Epoxy pH/ATC Triode</li> <li>• 013005MD DuraProbe K = 0.475 Conductivity probe (1 <math>\mu</math>S/cm to 200 mS/cm)</li> </ul>	<ul style="list-style-type: none"> <li>• Beaker</li> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches)</li> <li>• 1413 <math>\mu</math>S/cm conductivity standard (10 x 15 mL pouches)</li> <li>• Soft field case</li> </ul>
1217502 / FW	<ul style="list-style-type: none"> <li>• 9107WMMD Low Maintenance Epoxy pH/ATC Triode with 3 m cable</li> <li>• 013010MD DuraProbe K = 0.475 Conductivity probe with 3 m cable (1 <math>\mu</math>S/cm to 200 mS/cm)</li> </ul>	<ul style="list-style-type: none"> <li>• Beaker</li> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches)</li> <li>• 1413 <math>\mu</math>S/cm conductivity standard (10 x 15 mL pouches)</li> <li>• Soft field case</li> </ul>
1217101 / FW	<ul style="list-style-type: none"> <li>• 9107BNMD Low Maintenance Epoxy pH/ATC Triode</li> <li>• 013005MD DuraProbe K = 0.475 Conductivity probe (1 <math>\mu</math>S/cm to 200 mS/cm)</li> </ul>	–
1217102 / FW	<ul style="list-style-type: none"> <li>• 9107WMMD Low Maintenance Epoxy pH/ATC Triode with 3 m cable</li> <li>• 013010MD DuraProbe K = 0.475 Conductivity probe with 3 m cable (1 <math>\mu</math>S/cm to 200 mS/cm)</li> </ul>	• Beaker

## Benchtop Meter



### Description

- Stirrer probe control
- IP54 splashproof and dustproof
- Universal power adapter and battery power, 4 x AA batteries

### Meter Only

Cat. No.	Package
1117000	Includes meter, universal power and user's guide

### Meter Kits

Cat. No. / Application	Sensor (s)	Accessories and Solutions
1117001 / FW	<ul style="list-style-type: none"> <li>• 9157BNMD Refillable Epoxy pH/ATC Triode</li> <li>• 013605MD DuraProbe K = 0.55 Conductivity probe (10 <math>\mu</math>S/cm to 200 mS/cm)</li> </ul>	<ul style="list-style-type: none"> <li>• Swing arm electrode stand</li> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, 10.01 buffers (pint bottles)</li> <li>• 1413 <math>\mu</math>S/cm conductivity standard (5 x 60 mL bottles)</li> </ul>
1117201 / FW	<ul style="list-style-type: none"> <li>• 9157BNMD Refillable Epoxy pH/ATC Triode</li> <li>• 013005MD DuraProbe K = 0.475 Conductivity probe (1 <math>\mu</math>S/cm to 200 mS/cm)</li> </ul>	• Swing arm electrode stand

# Thermo Scientific Orion 4-Star pH/DO Meter

EPA



- pH, DO and temperature measurements in a waterproof hand-held or splashproof benchtop meter
- Backlit display for easy viewing
- SMART STABILITY and SMART AVERAGING functions for automatically optimized accuracy, precision and response time
- Storage of up to 10 password protected methods for easy retrieval of operation procedures
- Compatible with polarographic-type probes
- Dissolved oxygen calibration to the Winkler Titration for BOD
- Salinity correction and automatic barometric pressure compensation
- Simultaneous display of pH, DO and temperature measurements
- Battery power delivers over 2,000 hours of continuous operation
- 3 year warranty

## Specifications

<b>pH</b>	Range	- 2.000 to 19.999
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	± 0.002
<b>mV</b>	Range	± 1999.9
	Resolution	0.1
	Relative Accuracy	± 0.2 or 0.05%, whichever is greater
<b>DO</b>	Concentration Range	0.00 to 90.0 mg/L
	Resolution	0.0, 0.00 mg/L
	Relative Accuracy	± 0.2 mg/L
	% Saturation Range	0.0 to 600 %
	Resolution	0, 0.0 %
	Relative Accuracy	± 2 %
	Calibration Features	Water Saturated Air, Air Saturated Water, Manual (Winkler), and Zero Point
Probe Type	Polarographic	
<b>Temperature</b>	Range	- 5 to 105 °C
	Resolution	0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	± 0.1 °C

## Recommended Accessories

Cat. No.	Description
810001	ROSS pH Electrode Storage Solution
910001	pH Electrode Storage Solution
910199	All-in-One pH Buffer Kit
080513	DO Probe Maintenance Kit for 083005MD and 083010MD
080113	DO Probe Maintenance Kit for 081010MD
080514	DO Electrolyte Solution

See page 40-42 for a complete list of accessories

www.thermo.com/water



EPA

Compliant with EPA testing method

## Portable Meter



### Description

- IP67 waterproof and dustproof
- 4 x AA batteries, powerless data protection

### Meter Only

Cat. No.	Package
1216000	Includes meter, batteries and user's guide

### Meter Kits

Cat. No. / Application	Sensor (s)	Accessories and Solutions
1216001 / FW	<ul style="list-style-type: none"> <li>• 9107BNMD Low Maintenance Epoxy pH/ATC Triode</li> <li>• 083005MD DO probe with calibration sleeve</li> </ul>	<ul style="list-style-type: none"> <li>• Beaker</li> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches)</li> <li>• DO probe maintenance kit - 080513</li> <li>• Protective probe guard</li> <li>• Hard field case</li> </ul>
1216002 / FW	<ul style="list-style-type: none"> <li>• 9107WMMD Low Maintenance Epoxy pH/ATC Triode with 3 m cable</li> <li>• 083010MD DO probe with 3 m cable and calibration sleeve</li> </ul>	<ul style="list-style-type: none"> <li>• Beaker</li> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches)</li> <li>• DO probe maintenance kit - 080513</li> <li>• Protective probe guard</li> <li>• Hard field case</li> </ul>
1216501 / FW	<ul style="list-style-type: none"> <li>• 9107BNMD Low Maintenance Epoxy pH/ATC Triode</li> <li>• 083005MD DO probe with calibration sleeve</li> </ul>	<ul style="list-style-type: none"> <li>• Beaker</li> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches)</li> <li>• DO probe maintenance kit - 080513</li> <li>• Protective probe guard</li> <li>• Soft field case</li> </ul>
1216502 / FW	<ul style="list-style-type: none"> <li>• 9107WMMD Low Maintenance Epoxy pH/ATC Triode with 3 m cable</li> <li>• 083010MD DO probe with 3 m cable and calibration sleeve</li> </ul>	<ul style="list-style-type: none"> <li>• Beaker</li> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches)</li> <li>• DO probe maintenance kit - 080513</li> <li>• Protective probe guard</li> <li>• Soft field case</li> </ul>
1216101 / FW	<ul style="list-style-type: none"> <li>• 9107BNMD Low Maintenance Epoxy pH/ATC Triode</li> <li>• 083005MD DO probe with calibration sleeve</li> </ul>	<ul style="list-style-type: none"> <li>• DO probe maintenance kit - 080513</li> <li>• Protective probe guard</li> </ul>
1216102 / FW	<ul style="list-style-type: none"> <li>• 9107WMMD Low Maintenance Epoxy pH/ATC Triode with 3 m cable</li> <li>• 083010MD DO probe with 3 m cable and calibration sleeve</li> </ul>	<ul style="list-style-type: none"> <li>• DO probe maintenance kit - 080513</li> </ul>

## Benchtop Meter



### Description

- Stirrer and DO AUTO-STIR probe control
- IP54 splashproof and dustproof
- Universal power adapter and battery power, 4 x AA batteries

### Meter Only

Cat. No.	Package
1116000	Includes meter, universal power and user's guide

### Meter Kits

Cat. No. / Application	Sensor (s)	Accessories and Solutions
1116001 / TRIS FW	<ul style="list-style-type: none"> <li>• 8102BNUWP ROSS Ultra Refillable Glass pH Electrode</li> <li>• 927005MD Epoxy ATC</li> <li>• 081010MD DO probe with 3 m cable</li> </ul>	<ul style="list-style-type: none"> <li>• Swing arm electrode stand</li> <li>• pH 4.01, 7.00, and 10.01 buffers (pint bottles)</li> <li>• DO calibration sleeve</li> <li>• BOD reservoir, stirrer, and adapter</li> <li>• DO probe maintenance kit - 080113</li> </ul>
1116201 / FW	<ul style="list-style-type: none"> <li>• 9157BNMD Refillable Epoxy pH/ATC Triode</li> <li>• 081010MD DO probe with 3 m cable</li> </ul>	<ul style="list-style-type: none"> <li>• Swing arm electrode stand</li> <li>• DO calibration sleeve</li> <li>• BOD reservoir, stirrer, and adapter</li> <li>• DO probe maintenance kit - 080113</li> </ul>

# Thermo Scientific Orion 3-Star pH Meter

EPA



- pH, mV and temperature measurements in a waterproof hand-held or splashproof benchtop meter
- Backlit display for easy viewing
- SMART STABILITY and SMART AVERAGING functions for automatically optimized accuracy, precision and response time
- Storage of up to 10 password protected methods for easy retrieval of operation procedures
- Simultaneous display of pH and temperature measurements
- Battery power delivers over 2,000 hours of continuous operation
- 3 year warranty

## Recommended Accessories

Cat. No.	Description
910199	All-in-One pH Buffer Kit
910168	pH 1.68 Buffer, 475 mL
9116860	pH 1.68 Buffer, 5 x 60 mL
910104	pH 4.01 Buffer, 475 mL
910460	pH 4.01 Buffer, 5 x 60 mL
910410	pH 4.01 Buffer, 10 x 15 mL
910105	pH 5.00 Buffer, 475 mL
910686	pH 6.86 Buffer, 475 mL
916860	pH 6.86 Buffer, 5 x 60 mL
910107	pH 7.00 Buffer, 475 mL
910760	pH 7.00 Buffer, 5 x 60 mL
910710	pH 7.00 Buffer, 10 x 15 mL
910918	pH 9.18 Buffer, 475 mL
9191860	pH 9.18 Buffer, 5 x 60 mL
910110	pH 10.01 Buffer, 475 mL
911060	pH 10.01 Buffer, 5 x 60 mL
911010	pH 10.01 Buffer, 10 x 15 mL
910112	pH 12.46 Buffer, 475 mL
911260	pH 12.46 Buffer, 5 x 60 mL

See page 40-42 for a complete list of accessories

## Specifications

<b>pH</b>	Range	- 2.000 to 19.999
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	± 0.002
<b>mV</b>	Range	± 1999.9
	Resolution	0.1
	Relative Accuracy	± 0.2 or 0.05%, whichever is greater
<b>Temperature</b>	Range	- 5 to 105 °C
	Resolution	0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	± 0.1 °C



## Portable Meter



### Description

- IP67 waterproof and dustproof
- 4 x AA batteries, powerless data protection

### Meter Only

#### Cat. No. Package

1212000 Includes meter, batteries and user's guide

### Meter Kits

Cat. No. / Application	Sensor (s)	Accessories and Solutions
1212001 / FW	<ul style="list-style-type: none"> <li>• 9107BNMD Low Maintenance Epoxy pH/ATC Triode</li> </ul>	<ul style="list-style-type: none"> <li>• Beaker</li> <li>• Electrode storage chamber</li> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches)</li> <li>• Hard field case</li> </ul>
1212002 / TRIS CLOG-FREE WW	<ul style="list-style-type: none"> <li>• 5107BNMD No Cal pH Electrode</li> </ul>	<ul style="list-style-type: none"> <li>• Beaker</li> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches)</li> <li>• Hard field case</li> </ul>
1212501 / FW	<ul style="list-style-type: none"> <li>• 9107BNMD Low Maintenance Epoxy pH/ATC Triode</li> </ul>	<ul style="list-style-type: none"> <li>• Beaker</li> <li>• Electrode storage chamber</li> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches)</li> <li>• Soft field case</li> </ul>
1212503 / ORP	<ul style="list-style-type: none"> <li>• 9179BNMD Low Maintenance Epoxy ORP/ATC Triode</li> </ul>	<ul style="list-style-type: none"> <li>• Meter impact jacket with electrode storage chamber</li> <li>• ORP standard (5 x 60 mL bottles)</li> <li>• Soft field case</li> </ul>
1212101 / FW	<ul style="list-style-type: none"> <li>• 9107BNMD Low Maintenance Epoxy pH/ATC Triode</li> </ul>	–
1010115 / FW	<ul style="list-style-type: none"> <li>• 9107BNMD Low Maintenance Epoxy pH/ATC Triode</li> </ul>	<ul style="list-style-type: none"> <li>• Meter impact jacket with electrode storage chamber</li> <li>• Electrode rinse solution (25 x 15 mL pouches)</li> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00 and 10.01 buffers (10 x 15 mL pouches)</li> <li>• Soft field case</li> <li>• Method Note - pH of Saltwater</li> </ul>
1010110 / WW	<ul style="list-style-type: none"> <li>• 5107BNMD No Cal pH Electrode</li> </ul>	<ul style="list-style-type: none"> <li>• Electrode storage chamber</li> <li>• pH electrode storage solution (5 x 60 mL bottles)</li> <li>• pH 4.01, 7.00 and 10.01 buffers (10 x 15 mL pouches)</li> <li>• Method Note - pH of Wastewater</li> </ul>

## Benchtop Meter



### Description


- Stirrer probe control
- IP54 splashproof and dustproof
- Universal power adapter and battery power, 4 x AA batteries

### Meter Only

#### Cat. No. Package

1112000 Includes meter, universal power and user's guide

### Meter Kits

Cat. No. / Application	Sensor (s)	Accessories and Solutions
1112001 / FW	<ul style="list-style-type: none"> <li>• 9157BNMD Refillable Epoxy pH/ATC Triode</li> </ul>	<ul style="list-style-type: none"> <li>• Swing arm electrode stand</li> <li>• pH 4.01, 7.00, and 10.01 buffers and pH electrode storage solution (pint bottles)</li> </ul>
1112003 / TRIS FW	<ul style="list-style-type: none"> <li>• 8102BNUWP ROSS Ultra Refillable Glass pH Electrode</li> <li>• 927005MD Epoxy ATC</li> </ul>	<ul style="list-style-type: none"> <li>• Swing arm electrode stand</li> <li>• pH 4.01, 7.00, and 10.01 buffers and pH electrode storage solution (pint bottles)</li> </ul>
1112004 / CLOG-FREE WW	<ul style="list-style-type: none"> <li>• 9172BNWP Sure-Flow Refillable Glass pH Electrode</li> <li>• 927007MD Stainless Steel ATC</li> </ul>	<ul style="list-style-type: none"> <li>• Swing arm electrode stand</li> <li>• pH 4.01, 7.00, and 10.01 buffers and pH electrode storage solution (pint bottles)</li> </ul>
1112006 / TRIS UPW	<ul style="list-style-type: none"> <li>• 8102BNUWP ROSS Ultra Refillable Glass pH Electrode</li> <li>• 927005MD Epoxy ATC</li> </ul>	<ul style="list-style-type: none"> <li>• Swing arm electrode stand</li> <li>• pH electrode storage solution, pH 4.10, 6.79, and 9.15 pure water buffers (pint bottles)</li> <li>• pHISA adjuster solution (5 x 60 mL bottles)</li> </ul>
1112201 / FW	<ul style="list-style-type: none"> <li>• 9157BNMD Refillable Epoxy pH/ATC Triode</li> </ul>	<ul style="list-style-type: none"> <li>• Swing arm electrode stand</li> </ul>
1112202 / CLOG-FREE TRIS, WW	<ul style="list-style-type: none"> <li>• 8172BNWP ROSS Sure-Flow Refillable Glass pH Electrode</li> <li>• 927006MD Glass ATC</li> </ul>	<ul style="list-style-type: none"> <li>• Swing arm electrode stand</li> </ul>
1112203 / TRIS FW	<ul style="list-style-type: none"> <li>• 9156APWP AquaPro Low Maintenance Epoxy pH Electrode</li> </ul>	<ul style="list-style-type: none"> <li>• Swing arm electrode stand</li> </ul>
1112204 / FW	<ul style="list-style-type: none"> <li>• 9107BNMD Low Maintenance Epoxy pH/ATC Triode</li> </ul>	<ul style="list-style-type: none"> <li>• Swing arm electrode stand</li> </ul>
1112205 / FW	<ul style="list-style-type: none"> <li>• 9156BNWP Refillable Epoxy pH Electrode</li> <li>• 927007MD Stainless Steel ATC</li> </ul>	<ul style="list-style-type: none"> <li>• Swing arm electrode stand</li> </ul>
1112207 / FW	<ul style="list-style-type: none"> <li>• 9106BNWP Low Maintenance Epoxy pH Electrode</li> </ul>	<ul style="list-style-type: none"> <li>• Swing arm electrode stand</li> </ul>
1112208 / CLOG-FREE, WW	<ul style="list-style-type: none"> <li>• 9165BNWP Sure-Flow Refillable Epoxy pH Electrode</li> </ul>	<ul style="list-style-type: none"> <li>• Swing arm electrode stand</li> </ul>
1112101 / TRIS FW	<ul style="list-style-type: none"> <li>• 8102BNUWP ROSS Ultra Refillable Glass pH Electrode</li> <li>• 927007MD Stainless Steel ATC</li> </ul>	–
1112102 / CLOG-FREE TRIS, WW	<ul style="list-style-type: none"> <li>• 8172BNWP ROSS Sure-Flow Refillable Glass pH Electrode</li> <li>• 927006MD Glass ATC</li> </ul>	–
1112103 / TRIS, FW	<ul style="list-style-type: none"> <li>• 8102BNUWP ROSS Ultra Refillable Glass pH Electrode</li> </ul>	–
1112104 / FW	<ul style="list-style-type: none"> <li>• 9157BNMD Refillable Epoxy pH/ATC Triode</li> </ul>	–
1112105 / FW	<ul style="list-style-type: none"> <li>• 9156BNWP Refillable Epoxy pH Electrode</li> <li>• 927007MD Stainless Steel ATC</li> </ul>	–
1112107 / FW	<ul style="list-style-type: none"> <li>• 9106BNWP Low Maintenance Epoxy pH Electrode</li> </ul>	–
1112108 / CLOG-FREE, WW	<ul style="list-style-type: none"> <li>• 9165BNWP Sure-Flow Refillable Epoxy pH Electrode</li> </ul>	–
1010101	<ul style="list-style-type: none"> <li>• pH of Drinking Water, visit our website for kit contents</li> </ul>	
1010117 	<ul style="list-style-type: none"> <li>• pH of Soils, visit our website for kit contents</li> </ul>	

 Signifies a hazardous solution. See terms and conditions for important shipping information at [www.thermo.com/water](http://www.thermo.com/water).



# Thermo Scientific Orion 3-Star Conductivity Meter



- Conductivity, resistivity, TDS, salinity and temperature measurements in a waterproof hand-held or splashproof benchtop meter
- Meets all U.S. Pharmacopeia (USP) requirements
- Compatible with 2-, 4- and planar cells
- Backlit display for easy viewing
- SMART STABILITY and SMART AVERAGING functions for automatically optimized accuracy, precision and response time
- Storage of up to 10 password protected methods for easy retrieval of operation procedures
- Simultaneous display of conductivity and temperature measurements
- Battery power delivers over 2,000 hours of continuous operation
- 3 year warranty

## Specifications

<b>Conductivity</b>	Range	0.000 to 3000 mS/cm, auto resolution with cell constant dependence
	Resolution	4 significant digits down to 0.001 $\mu$ S/cm, cell constant dependent
	Relative Accuracy	0.5% $\pm$ 1 digit or 0.01 $\mu$ S/cm, whichever is greater
<b>Resistivity</b>	Range	0.0001 to 100 Megohm
	Resolution	Automatic
	Relative Accuracy	0.5 % $\pm$ 1 digit
<b>Salinity</b>	Range	0.01 to 80.0 ppt NaCl equivalent, 0.01 to 42 ppt practical salinity
	Resolution	0.01
	Relative Accuracy	$\pm$ 0.1 $\pm$ 1 digit
<b>TDS</b>	Range	0 to 19999
	Resolution	1 mg/L
	Relative Accuracy	$\pm$ 0.5 % $\pm$ 1 digit
<b>Temperature</b>	Range	- 5 to 105 °C
	Resolution	0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	$\pm$ 0.1 °C

## Recommended Accessories

Cat. No.	Description
910001	pH Electrode Storage Solution
910199	All-in-One pH Buffer Kit
011008	100 $\mu$ S/cm Conductivity/TDS Std, 5 x 60 mL
01100910	147 $\mu$ S/cm Conductivity Std, 10 pouches
011007	1413 $\mu$ S/cm Conductivity/TDS Std, 5 x 60 mL
01100710	1413 $\mu$ S/cm Conductivity/TDS Std, 10 pouches
011006	12.9 mS/cm Conductivity/TDS Std, 5 x 60 mL
01100610	12.9 mS/cm Conductivity/TDS Std, 10 pouches
011005	111 mS/cm Conductivity Std, 5 x 60 mL
01100510	111 mS/cm Conductivity Std, 10 pouches
990106	0.1 M KCl Conductivity Std, 475 mL

See page 40-42 for a complete list of accessories



**EPA** Compliant with EPA testing method

**USP** Compliant with USP requirements

Visit [www.thermo.com/water](http://www.thermo.com/water) for USP Electrode Application Notes.

## Portable Meter



### Description

- IP67 waterproof and dustproof
- 4 x AA batteries, powerless data protection

### Meter Only

Cat. No.	Package
1214000	Includes meter, batteries and user's guide

### Meter Kits

Cat. No. / Application	Sensor (s)	Accessories and Solutions
1214001 / FW WW	• 013005MD DuraProbe K = 0.475 Conductivity probe (1 $\mu\text{S}/\text{cm}$ to 200 $\text{mS}/\text{cm}$ )	<ul style="list-style-type: none"> <li>• 1413 <math>\mu\text{S}/\text{cm}</math> conductivity standard (10 x 15 mL pouches)</li> <li>• Hard field case</li> </ul>
1214002 / UPW	• 013016MD K = 0.1 Conductivity probe (0.01 $\mu\text{S}/\text{cm}$ to 300 $\mu\text{S}/\text{cm}$ ) with flow cell	<ul style="list-style-type: none"> <li>• 100 <math>\mu\text{S}/\text{cm}</math> conductivity standard (5 x 60 mL bottles)</li> </ul>
1214003 / FW WW	• 013610MD K = 0.55 Conductivity probe with 3 m cable (10 $\mu\text{S}/\text{cm}$ to 200 $\text{mS}/\text{cm}$ )	<ul style="list-style-type: none"> <li>• 1413 <math>\mu\text{S}/\text{cm}</math> conductivity standard (10 x 15 mL pouches)</li> <li>• Hard field case</li> </ul>
1214004 / UPW	• 013016MD K = 0.1 Conductivity probe (0.01 $\mu\text{S}/\text{cm}$ to 300 $\mu\text{S}/\text{cm}$ ) with flow cell	<ul style="list-style-type: none"> <li>• 100 <math>\mu\text{S}/\text{cm}</math> conductivity standard (5 x 60 mL bottles)</li> <li>• Hard field case</li> </ul>
1214501 / FW WW	• 013005MD DuraProbe K = 0.475 Conductivity probe (1 $\mu\text{S}/\text{cm}$ to 200 $\text{mS}/\text{cm}$ )	<ul style="list-style-type: none"> <li>• 1413 <math>\mu\text{S}/\text{cm}</math> conductivity standard (10 x 15 mL pouches)</li> <li>• Soft field case</li> </ul>
1214503 / FW WW	• 013610MD DuraProbe K = 0.55 Conductivity probe with 3 m cable (10 $\mu\text{S}/\text{cm}$ to 200 $\text{mS}/\text{cm}$ )	<ul style="list-style-type: none"> <li>• 1413 <math>\mu\text{S}/\text{cm}</math> conductivity standard (10 x 15 mL pouches)</li> <li>• Soft field case</li> </ul>
1214504 / UPW	• 013016MD K = 0.1 Conductivity probe (0.01 $\mu\text{S}/\text{cm}$ to 300 $\mu\text{S}/\text{cm}$ ) with flow cell	<ul style="list-style-type: none"> <li>• 100 <math>\mu\text{S}/\text{cm}</math> conductivity standard (5 x 60 mL bottles)</li> <li>• Soft field case</li> </ul>
1010122 / FW	• 013010MD DuraProbe K = 0.475 Conductivity probe with 3 m cable (1 $\mu\text{S}/\text{cm}$ to 200 $\text{mS}/\text{cm}$ )	<ul style="list-style-type: none"> <li>• Electrode storage chamber</li> <li>• 1413 <math>\mu\text{S}/\text{cm}</math> conductivity standard (10 x 15 mL pouches)</li> <li>• 12.9 <math>\text{mS}/\text{cm}</math> conductivity standard (10 x 15 mL pouches)</li> <li>• Hard field case</li> <li>• Method Note - Conductivity of Freshwater</li> </ul>
1214101 / FW WW	• 013005MD DuraProbe K = 0.475 Conductivity probe (1 $\mu\text{S}/\text{cm}$ to 200 $\text{mS}/\text{cm}$ )	–

## Benchtop Meter



### Description

- Stirrer probe control
- IP54 splashproof and dustproof
- Universal power adapter and battery power, 4 x AA batteries

### Meter Only

Cat. No.	Package
1114000	Includes meter, universal power and user's guide

### Meter Kits

Cat. No. / Application	Sensor (s)	Accessories and Solutions
1114001 / FW WW	• 013005MD DuraProbe K = 0.475 Conductivity probe (1 $\mu\text{S}/\text{cm}$ to 200 $\text{mS}/\text{cm}$ )	<ul style="list-style-type: none"> <li>• 1413 <math>\mu\text{S}/\text{cm}</math> conductivity standard (5 x 60 mL bottles)</li> <li>• Swing arm electrode stand</li> </ul>
1114002 / UPW	• 013016MD K = 0.1 Conductivity probe (0.01 $\mu\text{S}/\text{cm}$ to 300 $\mu\text{S}/\text{cm}$ ) with flow cell	<ul style="list-style-type: none"> <li>• 100 <math>\mu\text{S}/\text{cm}</math> conductivity standard (5 x 60 mL bottles)</li> <li>• Swing arm electrode stand</li> </ul>
1114003 / UPW	• 013016MD K = 0.1 Conductivity probe (0.01 $\mu\text{S}/\text{cm}$ to 300 $\mu\text{S}/\text{cm}$ ) with flow cell	<ul style="list-style-type: none"> <li>• 100 <math>\mu\text{S}/\text{cm}</math> conductivity standard (5 x 60 mL bottles)</li> <li>• Conductivity calibration resistor kit</li> <li>• Star Navigator 21 software with RS232 computer cable</li> <li>• Swing arm electrode stand</li> </ul>

# Thermo Scientific Orion 3-Star Dissolved Oxygen Meter

EPA

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- DO and temperature measurements in a waterproof hand-held or splashproof benchtop meter
- Backlit display for easy viewing
- SMART STABILITY and SMART AVERAGING functions for automatically optimized accuracy, precision and response time
- Storage of up to 10 password protected methods for easy retrieval of operation procedures
- Enhanced stability indicators, salinity correction and automatic barometric pressure compensation
- Compatible with polarographic-type probes
- Dissolved oxygen calibration to the Winkler Titration for BOD
- Simultaneous display of DO and temperature measurements
- Battery power delivers over 2,000 hours of continuous operation
- 3 year warranty

## Specifications

<b>DO</b>	Concentration Range	0.00 to 90.0 mg/L
	Resolution	0.0, 0.00 mg/L
	Relative Accuracy	± 0.2 mg/L
	% Saturation Range	0.0 to 600 %
	Resolution	0, 0.0 %
	Relative Accuracy	± 2 %
	Calibration Features	Water Saturated Air, Air Saturated Water, Manual (Winkler), and Zero Point
	Probe Type	Polarographic
<b>Temperature</b>	Range	- 5 to 105 °C
	Resolution	0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	± 0.1 °C

## Recommended Accessories

Cat. No.	Description
080513	Maintenance Kit for 083010MD and 086030MD
080113	Maintenance Kit for 081010MD
080515	1 Membrane Cap for 083010MD and 086030MD
081003	3 Membrane Caps for 081010MD
080514	DO Electrolyte Solution

See page 40-42 for a complete list of accessories

www.thermo.com/water



EPA Compliant with EPA testing method

## Portable Meter



### Description

- IP67 waterproof and dustproof
- 4 x AA batteries, powerless data protection

### Meter Only

Cat. No.	Package
1213000	Includes meter, batteries and user's guide

### Meter Kits

Cat. No. / Application	Sensor (s)	Accessories and Solutions
1213101 / FW WW	• 083010MD DO probe with 3 m cable and calibration sleeve	• DO probe maintenance kit - 080513
1213001 / FW WW	• 083010MD DO probe with 3 m cable and calibration sleeve	• DO probe maintenance kit - 080513 • Hard field case
1213501 / FW WW	• 083010MD DO probe with 3 m cable and calibration sleeve	• DO probe maintenance kit - 080513 • Soft field case
1010121 / FW	• 083010MD DO probe with 3 m cable and calibration sleeve	• Electrode storage chamber • Polarographic electrolyte solution • Hard field case • Method Note - DO in Freshwater
1010138 / WINE	• 083010MD DO probe with 3 m cable and calibration sleeve	• Electrode storage chamber • Polarographic electrolyte solution • Hard field case • Method Note - DO in Wine and Beer

## Benchtop Meter



### Description

- Stirrer and DO AUTO-STIR probe control
- IP54 splashproof and dustproof
- Universal power adapter and battery power, 4 x AA batteries

### Meter Only

Cat. No.	Package
1113000	Includes meter, universal power and user's guide

### Meter Kits

Cat. No. / Application	Sensor (s)	Accessories and Solutions
1113001 / FW WW	• 081010MD DO probe with 3 m cable	• DO calibration sleeve • BOD reservoir, stirrer, and adapter • DO probe maintenance kit - 080113 • Swing arm electrode stand
1010114 / WW BOD	• 086030MD AUTO-STIR DO/BOD probe with calibration sleeve	• Polarographic electrolyte solution • Method Note - BOD of Wastewater

# Thermo Scientific Orion 2-Star pH Meter Benchtop



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- pH, mV and temperature measurements in a splashproof benchtop meter
- 1, 2 or 3 point calibration
- Simple push button keypad
- Auto calibration for USA and EURO buffers
- 3 year warranty

## Description

- IP54 splashproof and dustproof
- Universal power adapter and battery power, 4 x AA batteries

## Specifications

Parameter	Specification	
<b>pH</b>	Range	0.000 to 14.999
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	± 0.002
	Auto-Buffer-Recognition	4.01, 7.00, 10.01 / 1.68, 6.86, 9.18, 12.46
	Calibration Points	1, 2 or 3
	Selectable Calibration Sets	USA or EURO
Custom Buffers Accepted	Yes	
<b>Millivolts</b>	Range	± 1999.9
	Resolution	0.1
	Relative Accuracy	± 0.2 or 0.05% of reading, whichever is greater
<b>Relative Millivolts</b>	Range	± 1999.9
	ORP Mode with E <sub>H</sub> Autocalibration to Standard Hydrogen Electrode	Yes
	Resolution	0.1
	Relative accuracy	± 0.2 or 0.05% of reading, whichever is greater
<b>Temperature</b>	Range	- 5 to 105 °C
	Resolution	0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	± 0.1 °C

## Meter Only

Cat. No.	Package
1111000	Includes meter, universal power and user's guide

## Meter Kits

Cat. No. / Application	Sensor (s)	Accessories and Solutions
1111001 / FW	• 9157BNMD Refillable Epoxy pH/ATC Triode	• Swing arm electrode stand • pH 4.01, 7.00, and 10.01 buffers and pH electrode storage solution (pint bottles)

Cat. No. with Stand	Sensor (s)	Applications
1111201	• 9165BNWP Sure-Flow Refillable Epoxy pH Electrode	WW CLOG-FREE
1111202	• 9157BNMD Refillable Epoxy pH/ATC Triode	FW
1111203	• 9156APWP AquaPro Low Maintenance Epoxy pH Electrode	TRIS
1111204	• 9142BN Refillable Glass pH Electrode • 927007MD Stainless Steel ATC	FW
1111205	• 9142BN Refillable Glass pH Electrode	FW
1111206	• 9145BN Low Maintenance Epoxy pH Electrode	FW
1111207	• 9107BNMD Low Maintenance Epoxy pH/ATC Triode	FW
1111208	• 9107APMD AquaPro Low Maintenance Epoxy pH/ATC Triode	TRIS

## Recommended Accessories

Cat. No.	Description
910001	pH Electrode Storage Solution
910199	All-in-One pH Buffer Kit

See page 40-42 for a complete list of accessories



Compliant with EPA testing method

# Thermo Scientific Orion Star Navigator 21™ Software



This data-logging and control software, designed to enable compliance with auditors and regulatory agencies, sets the bar for industry best-practices in the pharmaceutical, food and beverage and environmental industries.

- Provides the tools for FDA 21 CFR Part 11 compliance; on/off mode flexibility.
- Included with all 5-Star meters and 5-Star meter kits.
- Available as a stand alone product (Cat. No. 1010007) to upgrade 3-Star and 4-Star meters.
- Compatible with the Windows XP®† operating system.

## Complete control of your meter from your PC

Now you can efficiently edit, create and change methods, take measurements, perform routine data browsing, retrieval, printing and exporting all with a few key strokes from your desk or laptop PC. Microsoft®† Windows Operating System defined password protected security parameters enable individual user accounts.

† Registered trademark of Microsoft Corporation.

- System Access (Login/Logoff) – Login is strictly regulated by entering a valid username and password. Security measures include account lockout after a predetermined number of unsuccessful login attempts and automatic password protected screensavers.
- Password Rules and Management-Complex password capabilities (i.e., a combination of uppercase and lowercase characters, digits, and/or non-alphanumeric characters) may be enforced as a means of extended security.
- Audit Trails – Records important events and includes in the audit trail function which lists user, date, time, event importance, application, description of event, and details of the event.
- Electronic Signatures – All changes are recorded with a digital signature and the users must provide reasons for changes.
- Data Security – All data is stored in a database and it is impossible to remove or alter data in an uncontrolled manner. The database can only be accessed with the proper tools and user rights. Data integrity is verified each time data is accessed.

Cat. No.	Description
1010007	Star Navigator 21 Software– Includes RS232 computer interface cable
1010152	5-Star pH/ISE/DO/Conductivity benchtop meter – Pharmaceutical Water Conductivity USP <645> application kit
1114003	3-Star Conductivity benchtop meter kit for ultra pure water
1115003	4-Star pH/ISE benchtop meter kit with ROSS Ultra pH Electrode
1115004	4-Star pH/ISE benchtop meter kit with Sure-Flow pH Electrode
1218001	5-Star pH/DO/Conductivity portable meter kit
1119001	5-Star pH/ISE/DO/Conductivity benchtop meter kit
1219001	5-Star pH/ISE/DO/Conductivity portable meter kit

Features	Benefits
User friendly Windows interface	Easy to install and operate
Complete control from your computer	Allows quick operation of custom Orion Star Series methods
Convenient report templates	Provide framework for compliance reporting, capability to customize
Electronic records, signatures and audit trails	Provide the tools for FDA 21 CFR Part 11 compliance
Enables paperless record system	Saves time and money in the approval process

# Thermo Scientific Orion PerpHecT® LogR™ Meters

## LogR temperature compensation from pH bulb – no ATC probe required!

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All PerpHecT benchtop meters feature exclusive digital LogR technology. pH is temperature dependent, so knowing the temperature at which the pH was taken is critical. Only one electrode is needed to take both pH and temperature measurements and both measurements are taken at the same location, the pH sensing bulb. PerpHecT pH electrodes are available in a wide variety of styles and sizes, but the greatest accuracy and precision benefit of LogR technology is with small samples.

For small sample applications, we have paired our PerpHecT meter with our new ROSS micro electrode, specifically suited for pharmaceutical, biotech and university needs. See the new PerpHecT kits highlighted below. PerpHecT ROSS kits offer outstanding temperature equilibration and

performance features. All meters also offer automatic (with an ATC probe) or manual temperature compensation options as well as a 3 year warranty.

- 320 PerpHecT benchtop meter performs pH or mV and temperature measurements
- 350 PerpHecT benchtop meter has more advanced features, and an RS232 data output.
- 370 PerpHecT benchtop adds an ISE (concentration) mode

*\* Over 20 °C temperature calibration range. PerpHecT LogR temperature measurement and compensation specifications are based on the use of PerpHecT and PerpHecT ROSS brand electrodes. Use of other brand electrodes may impact performance.*

Specifications	370 / 350 / 320
<b>pH</b>	
Range	0.000 to 14.000 / 0.000 to 14.000 / 0.00 to 14.00
Resolution	0.001 to 0.1 / 0.001 to 0.1 / 0.01 to 0.1
Relative Accuracy	± 0.005 / ± 0.005 / ± 0.02
Slope	80 to 120%
Auto-Buffer Recognition	4.01, 7.00, 10.01
Cal. Points	3 / 3 / 2
<b>Concentration</b>	
Range	0.000 to 19900 / - / -
Resolution	± 3 significant digit / - / -
Relative Accuracy	± 0.2 mV or ± 0.5 % of reading, whichever is greater / - / -
Cal. Points	2 / - / -
<b>Temperature*</b>	
Range	0.0 to 100.0 °C
Rel. Accuracy	± 0.1 °C (ATC) ± 0.5 °C (LogR)
<b>Millivolt and Relative Millivolt</b>	
Range	±1999.9 mV and RmV/ ±1999.9 mV and RmV/ ±1999 mV only
LogR Range	± 1000.0 mV / ± 1000.0 mV / ± 1000 mV
Relative Accuracy (mV and RmV)	± 0.2 mV or ± 0.05 % of reading, whichever is greater/ ± 0.2 mV or ± 0.05 % of reading, whichever is greater/ ± 1 mV or ± 0.1 % of reading, whichever is greater (mV only)
<b>Display</b>	LED
<b>Inputs</b>	1 BNC, 1 pin tip ref, ATC, power
<b>Outputs</b>	RS232, 2.5 mm Recorder/ RS232, 2.5 mm Recorder / -
<b>Power Requirements</b>	AC Line, 110 V, 220 V or 240 V
<b>Agency Approvals</b>	CE, CSA, UL
<b>Environmental Requirements</b>	5 to 45 °C, 5 to 85% relative humidity, non-condensing

Cat. No.	370 / 350 / 320
Meter & Ag/AgCl pH Electrode (110V)	037000 <sup>1</sup> / 035000 <sup>1</sup> / 032000 <sup>3</sup>
Meter & Ag/AgCl pH Electrode (220V)	037001 <sup>1</sup> / 035001 <sup>1</sup> / 032001 <sup>3</sup>
Meter & ROSS pH Electrode (110V)	0370A0 <sup>2</sup> / 0350A0 <sup>2</sup> / 0320A0 <sup>4</sup>
Meter & ROSS pH Electrode (220V)	0370A1 <sup>2</sup> / 0350A1 <sup>2</sup> / 0320A1 <sup>4</sup>
Meter & ROSS Micro (110V)	- / - / 032006 <sup>7</sup> <b>NEW</b>
Meter & ROSS Micro (220V)	- / - / 032007 <sup>7</sup> <b>NEW</b>
Meter, ROSS Micro & GLP Kit (110V)	- / 035003 <sup>5,7</sup> / - <b>NEW</b>
Meter, ROSS Micro & GLP Kit (220V)	- / 035004 <sup>5,7</sup> / - <b>NEW</b>
Meter & GLP Kit (110V)	0370G0 <sup>2,5</sup> / 0350G0 <sup>2,5</sup> / -
Meter & GLP Kit (220V)	0370G1 <sup>2,5</sup> / - / -
Meter & Adapter (110V)	0370A9 / 0350A9 / 0320A9
Meter & Adapter (220V)	0370A8 / 0350A8 / 0320A8
Meter & Adapter (240V)	0370A7 / 0350A7 / 0320A7
Meter, AquaPro & Stand (110V)	- / - / 032004 <sup>6</sup>
Meter, AquaPro & Stand (220V)	- / - / 032005 <sup>6</sup>

### Key Information

1. 9272BN PerpHecT Sure-Flow glass pH electrode
2. 8272BN PerpHecT ROSS Sure-Flow glass pH electrode
3. 9202BN PerpHecT glass pH electrode
4. 8202BN PerpHecT ROSS glass pH electrode
5. Includes PRT300 (110V) or PRT301 (220V) printer and interface cable to PerpHecT meter
6. Includes 9156APWP AquaPro epoxy pH electrode and swing arm electrode stand
7. Includes 8220BNWP PerpHecT ROSS Micro pH electrode and one 475 mL bottle each of 910104 (pH 4.01 buffer), 910107 (pH 7.00 buffer), 910110 (pH 10.01 buffer), and 810001 (ROSS pH electrode storage solution)



# Thermo Scientific Orion Aplus™ Dual Channel Meters

Less lab setup time and greater sample throughput



The best choice for advanced pH or pH/ISE measurements, these benchtop meters have two electrode inputs, reducing costly setup time. The microprocessor stores the calibration for each channel. Easy-to-understand user prompting for each meter operation and numeric keys simplify data input. Aplus meters offer GLPdoc documentation and remote operation through bidirectional RS232 interface to computer or printer. There is a 3 year warranty on all models.

- 525Aplus for pH/mV/ORP/BOD/temperature measurements offers a 3 point calibration on each channel

- 720Aplus for pH/mV/ORP/ISE temperature measurements offers a 5 point pH or ISE calibration and automatic blank correction for low level ISE measurements.
- 920Aplus for pH/mV/ORP/ISE temperature measurements offers pre-programmed incremental techniques (Double-Known Addition and Subtraction) and calibration edit. Maximize your efficiency by using the 607 switchbox, which allows up to 7 channels to be used on your meter.

**See page 71 for switchbox ordering information.**

Specifications	920A+ / 720A+ / 525A+
<b>pH</b>	
Range	- 2.000 to 19.999
Relative Accuracy	± 0.02
Slope	80 to 120%
Auto-Buffer Recognition	1.68, 4.01, 7.00, 10.01, 12.46
Cal. Points	5 / 5 / 3
<b>Concentration (ISE)</b>	
Range	0.000 to 19900 / 0.000 to 19900 / –
Resolution	± 1 least significant digit / ± 1 least significant digit / –
Relative Accuracy	± 0.5% of reading / ± 0.5% of reading / –
Cal. Points	5 / 5 / –
<b>Temperature</b>	
Range	- 5.0 to 105.0 °C
Rel. Accuracy	± 0.1 °C
<b>Millivolt and Relative Millivolt</b>	
Range	± 1600.0 mV and ± 1999.9 RmV
Relative Accuracy	± 0.2 mV or ± 0.05 % of reading, whichever is greater
<b>Display</b>	
	Custom color vacuum fluorescent
<b>Inputs</b>	
	2 BNC, 2 pin tip, ATC, power, RS232
<b>Outputs</b>	
	RS232, 2.5 mm recorder, Karl Fischer
<b>Power Requirements</b>	
	AC Line, 110 V, 220 V or 240 V
<b>Agency Approvals</b>	
	CE, CSA, UL
<b>Environmental Requirements</b>	
	5 to 45 °C, and < 85% relative humidity, non-condensing

Cat. No.	920A+ / 720A+ / 525A+
Meter & ROSS Ultra pH Electrode	0920A0 (110V) <sup>1</sup> or 0920A1 (220V) <sup>1</sup> / 0720A0 (110V) <sup>1</sup> or 0720A1 (220V) <sup>1</sup> / 0525A0 (110V) <sup>2</sup> or 0525A1 (220V) <sup>2</sup>
Meter (110V) & Swing Arm Stand	0920A3 <sup>3</sup> / 0720A3 <sup>3</sup> / –
Meter (110V), Triode & Starter Package	– / – / 0525A3 <sup>4</sup>
pH & BOD Electrode Package	– / – / 0525A4 (110V) <sup>2,5</sup> or 0525A5 (220V) <sup>2,5</sup>
pH & ORP Electrode Package	– / – / 0525A6 (110V) <sup>2,6</sup> or 0525A7 (220V) <sup>2,6</sup>
Meter & Adapter (110V)	0920A9 <sup>3</sup> / 0720A9 <sup>3</sup> / 0525A9 <sup>3</sup>
Meter & Adapter (220V)	0920A8 <sup>3</sup> / 0720A8 <sup>3</sup> / 0525A8 <sup>3</sup>
Meter & Adapter (240V)	0920A7 <sup>3</sup> / 0720A7 <sup>3</sup> / 052507 <sup>3</sup>

## Key Information

1. 8102BNUWP ROSS Ultra glass pH electrode
2. 8156BNUWP ROSS Ultra epoxy pH electrode
3. Order electrode separately
4. Includes 9157BN Refillable pH/ATC Triode, 910199 All-in-One solutions kit, and swing arm electrode stand
5. 970899WP BOD electrode for BNC input
6. 9678BNWP Sure-Flow epoxy ORP electrode

# Thermo Scientific Orion Intrinsicly Safe\* Meters

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- For use where non-sparking equipment is desired, these carry US intrinsicly safe approval rating by Factory Mutual (FM)\*.
- Waterproof, portable models for basic field measurements
- Meters include advanced GLPdoc 100 point datalogger with time and date stamp and includes software program for simplified data collection and remote operation on a computer.

\* Does not meet European Intrinsicly Safe specification.

Specifications	266S / 261S	136S / 131S
<b>Type</b>	pH/mV	Conductivity
<b>pH</b>		
Range	-2.00 to 16.00	--
Accuracy	0.01	--
Calibration Points	3	--
<b>Temperature</b>		
Range	-20.0 °C to 120.0 °C	-20.0 °C to 120.0 °C
Relative Accuracy	± 0.3 °C	± 0.3 °C
<b>mV</b>		
Range	± 1300.0 mV	--
Accuracy	0.1% value + 0.30	--
<b>Conductivity</b>		
Range	--	0.00 µS/cm to 500.0 mS/cm, cell constant dependant
Accuracy	--	< 0.5 % of measure value + 1 count
Resolution	--	0.01 at < 99.99 µS/cm; 0.1 at > 99.99 µS/cm
<b>Salinity Range</b>	--	0.0 to 45.0 (10 to 30 °C)
<b>Total Dissolved Solids Range</b>	--	0 to 1999 mg/L (10 to 40 °C)
<b>Cell Constant Range</b>	--	0.010 cm <sup>-1</sup> to 199.0 cm <sup>-1</sup>
<b>Display</b>	Custom LCD	Custom LCD
<b>Inputs</b>	Waterproof DIN, Dual Banana Plug	Waterproof DIN, Dual Banana Plug
<b>Outputs</b>	RS232	RS232
<b>Power Requirements</b>	3 alkaline AA batteries	3 alkaline AA batteries
<b>Agency Approvals</b>	FM (intrinsicly safe)	FM (intrinsicly safe)
<b>Environmental Requirements</b>	-10 °C to 55 °C	-10 °C to 55 °C

## Ordering Information

Cat. No.	266S / 261S	136S / 131S
<b>Meter &amp; Electrode</b>	0266S0 <sup>1</sup> / 0261S0 <sup>1</sup>	0136S0 <sup>4</sup> / 0131S0 <sup>4</sup>
<b>Meter, Electrode &amp; Field Kit</b>	0266S3 <sup>2</sup> / 0261S3 <sup>2</sup>	0136S3 <sup>5</sup> / 0131S3 <sup>5</sup>
<b>Replacement Field Case</b>	026AKT <sup>3</sup> / 026AKT <sup>3</sup>	026AKT <sup>3</sup> / 026AKT <sup>3</sup>

## Key Information

**1.** Waterproof 9109WP Low Maintenance pH/ATC Triode **2.** Includes waterproof 9109WP pH/ATC Triode, neck strap, manual, field case, stand, electrode holder, beakers and pH 4, 7, 10 buffers (266S also includes RS232 cable and software) **3.** Order meter, electrode and buffers separately **4.** Includes 013010A DuraProbe conductivity cell **5.** Field kit includes meter, 013010A DuraProbe conductivity cell, beakers and standards.

# Thermo Scientific Orion Test Strips and Reagent Kits



## AQUAfast® Test Strips

- Dip and Read the Results Immediately
- Low-level Screening Reduces Laboratory Work and Costs
- No Calibration, No Hassle!

## Total Alkalinity Test Kit

- Direct Reading 0-200 ppm as CaCO<sub>3</sub>
- Requires No Special Equipment
- No Interference from Color or Turbidity

Total Alkalinity is as easy as pH! The Total Alkalinity Test Kit is a two-step direct measurement for total alkalinity and pH. Calibrate for pH as usual, add the Alkalinity Reagent and read total alkalinity in ppm CaCO<sub>3</sub> from the enclosed pH conversion chart. Saves time by eliminating additional equipment set-up, tedious titrations and calculations.

## Pure Water® pH Test Kit

- Increases Measurement Accuracy
- Reduces Electrode Drift
- Eliminates Contamination of Sample

Many laboratories take pH measurements of “pure water” with low levels of acid, base or dissolved salts. The low conductivity and limited buffering capacity of low ionic strength pure water causes pH electrodes to drift, producing non-reproducible and inaccurate results. Using the Pure Water pH Test Kit provides fast, accurate pH results in high purity waters. This kit contains special low ionic strength buffers for calibration and an additive, called pHISA Adjustor, to increase sample ionic strength without changing its pH. Recommended for samples such as well water, rain water, distilled/deionized water, boiler feed water, and process water. For best results, a high quality pH electrode such as the 8102BNUWP ROSS Ultra pH electrode is recommended.

Cat. No.	Test Strips	Increments	No of Tests
T2210P	pH A	1 - 12 pH	200
T2220P	pH B	4 - 9 pH	200
T2030P	Chlorine, Total	0, 1, 3, 10, 30, 100 mg/L	100
T2050P	Iron	0, 2, 5, 10, 25, 50, 100 mg/L	100
T2060P	Copper	0, 1, 3, 10, 30, 100 mg/L	100
T2070P	Peroxide	0, 0.5, 2, 5, 10, 25 mg/L	100
T2080P	Nitrate/Nitrite	0, 10, 25, 50, 100, 250, 500/ 0, 1, 5, 10, 25, 40, 80 mg/L	100
T2100P	Hardness	0 - 445 mg/L	100

Total Alkalinity Test Kit	
Cat. No.	Description
700010	One 475 mL bottle alkalinity reagent (700011), one 475 mL bottle alkalinity standard/control (700012), Total alkalinity conversion chart, Application Procedure No. 517 “Total Alkalinity in Natural Waters”.

Pure Water pH Test Kit	
Cat. No.	Description
700001	<b>Pure Water pH Test Kit</b> – Includes four 475 mL bottles Pure Water pH buffer A pH 6.97 (700702), two 475 mL bottles Pure Water pH buffer B pH 4.10 (700402), two 50 mL bottles pHISA Adjustor (700003), one 1 mL syringe, instruction card and Application Procedure No. 501 “pH Measurement in Low Ionic Strength Solutions”.
700702	<b>Pure Water pH buffer A, pH 6.97</b> – Includes four 475 mL bottles pH buffer A
700402	<b>Pure Water pH buffer B, pH 4.10</b> – Includes four 475 mL bottles pH buffer B
700902	<b>Pure Water pH buffer C, pH 9.15</b> – Includes four 475 mL bottles pH buffer C
700003	<b>pHISA Adjustor Solution Bulk Pack</b> – Includes five 60 mL bottles pHISA Pure Water Ionic Strength Adjustor, one syringe dispenser

ROSS and the COLL traddress are trademarks of Thermo Fisher Scientific Inc. US Patent 6,793,787

## Thermo Scientific Orion Meter Accessories

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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.thermo.com/water](http://www.thermo.com/water).



**Stirrer Probe and Paddle, Fits Swing Arm Stand, Cat. No. 096019**



**Swing Arm Stand, Cat. No. 090043**



**Star Series Inkjet Printer, Cat. No. 1010006**



**Soft Field Case, Cat. No. 1210005**



**Hard Field Case, Cat. No. 1210004**



**Star Meter Impact Jacket, Cat. No. 1210002**



**607 Electrode Switchbox**

**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	Star Series Inkjet Printer, 110 V / 220V and Cable
1010007	Star Navigator 21 Software and Computer Cable
1010008	Ink Cartridge for Star Series Printer
1010009	Paper for 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	Automatic Stirrer Probe with Paddle (For Benchtop Star Series Meters)
096021	Replacement Paddles for 096019 – 3 Pack
090043	Swing Arm Electrode Stand
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)
0607CA	607 Multi-Channel Electrode Switchbox and Cables, 110 V
0607CI	607 Multi-Channel Electrode Switchbox and Cables, 220 V

**Aplus™ and PerpHecT® Meter Accessories**

Cat. No.	Description
020125	110V Power Adapter
020130	220V Power Adapter
020135	240V 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, 110V
0900A1	900A Thermal Printer for Aplus Meters, 220V
0900A7	900A Thermal Printer for Aplus Meters, 240V
0900A4	Paper for 900A Printer
0900A6	Battery Pack for 900A Printer
PRT300	PRT300 Ink Printer and Cable for Aplus and PerpHecT Meters, 110V
PRT301	PRT300 Ink Printer and Cable for Aplus and PerpHecT Meters, 220V
PRT302	Ink Ribbon for PRT300 Printer
0ACBLO	RS232 Computer Cable for Aplus and PerpHecT Meters
0PBLSK	Aplus Portable Meter Starter Kit – Includes Field Case, Field Stand, Beaker, 2 x 60mL Bottles Each of pH 4.01, 7.00, and 10.01 Buffers, and 1 x 60mL 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

**Intrinsically Safe Meter Accessories**

Cat. No.	Description
013655	Electrode Clip
013652	RS232 Printer and Computer Interface Cable
026AKT	Field Case

# Thermo Scientific Orion AQUAfast® IV Colorimeter

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## 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 feature – Auto-ID™.**

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 it 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 ampoules with diameters of 13, 16 or 24 mm. Best of all, the AQ4000 carries a full two-year warranty.

### The AQ4000 can also be used with the our tablets or powders.

- **Tablets:** Quick dissolve and easy to add to the sample. Tablets can be used with the AQUAfast II and IV 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. Powders can be used with any colorimeter on the market.
- **COD Reagents:** Available in three measurement ranges – low, mid and high range.

### Updating the AQ4000 with new methods is as simple as it gets!

The latest software updates are available at [www.thermo.com/water](http://www.thermo.com/water). A simple download procedure updates the colorimeter with the most current programs in a few quick, easy steps.

### Water Quality Kits

The AQ4000 is available in water quality kits that include all application-appropriate tests and equipment.




www.thermo.com/water

EPA

#### AQ4000 Colorimeter and Accessories

Cat. No.	Description
AQ4000	AQUAfast IV Colorimeter Only (order reagents separately)
AQ40FK	Field Kit for AQ4000
AQ40HS	Cyanide Test Kit
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

#### Water Quality Kits Featuring AQ4000

Cat. No.	Description
AQ4EK1 	Choice Clean Water Kit
AQ4EK2 	Clean Water Kit
AQ4EK3 	Dirty Water Kit



Compliant with EPA testing method



Signifies a hazardous solution. See terms and conditions for important shipping information at [www.thermo.com/water](http://www.thermo.com/water).



# Thermo Scientific Orion AQUafast® II Colorimeters

Available in 12 models to allow measurement of over 25 species!



The lightweight AQUafast II colorimeters have an easy to use three button interface that ensures error free measurements. Designed for single parameter methods in the field or the lab.

### Easy to use, lightweight microprocessor-based colorimeters.

- EPA approval for chlorine total tablets and powders!
- Simple, three-button user-interface to ensure error-free readings

- Rapid dissolving compact tablets with a long shelf life
- Battery operated - ideal for the field or lab use
- Test procedure based on methods accepted by regulatory agencies throughout the world
- Includes a rugged carrying case, cuvettes (vials), stir rod and instructions



### AQUafast II Colorimeters Single Parameter and Drinking Water Kits

Cat. No.	Each kit includes: meter, cuvettes, case, stir rod, brush, instructions, and tablet chemistries.
AQ2070	Chlorine (Free & Total) Kit
AQ2009	Fluoride Kit
AQ2007	Nitrate Kit
AQ2046	Nitrite, Nitrogen Kit
AQ2010	Turbidity
AQ2020	Drinking Water Kit (Aluminum, Chlorine (Free & Total), Chlorine Dioxide, Fluoride, pH)

### AQUafast II Colorimeters Multi-Parameter Kits

Cat. No.	Each kit includes: meter, cuvettes, case, stir rod, brush, and instructions; tablet chemistries sold separately.
AQ2040	COD Colorimeter
AQ2001	Multi-One (Alkalinity-m, Ozone)
AQ2002	Multi-Two (Copper/Zinc, Silica)
AQ2003	Multi-Three (Hydrazine, Manganese, Phosphate HR)
AQ2004	Multi-Four (Ammonia as Nitrogen, Phosphate LR, Sulfide)
AQ2005	Multi-Five (Aluminum, Bromine, Chloride, Copper, Iron, Sulfate)

### Replacement Vials, Standards and 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 Reference Standards Kit
AC201S	Turbidity Standards for AQ2010

 Compliant with EPA testing method

 Signifies a hazardous solution. See terms and conditions for important shipping information at [www.thermo.com/water](http://www.thermo.com/water).



# Thermo Scientific Orion AQUAfast® Turbidity and COD Products

The AQ4500 offers ratiometric range, which will give EPA, GLI method 2 equivalent numbers.




The AQ4500 Turbidimeter has dual source LED which allows readings that comply with both EPA 180.1 and ISO 7027 methodologies.

- Nephelometric and Ratiometric measurements with autoranging
- Data log capacity of up to 100 data points
- Readings in the range of 0 – 1000 NTU with a choice of units: NTU, FTU, FNU, ASBC or EBC
- Includes turbidity standards kit, rugged carrying case, and replacement cuvettes
- The AQ4500 is truly IP67 waterproof to a depth of 3 meters

Chemical Oxygen Demand (COD) chemistries comply with EPA guidelines and work with the AQUAfast II or IV colorimeters.




- Ideal for environmental and wastewater monitoring
- Convenient, ready to use reagent vials available in three ranges: 0-150 mg/L, 0-1,500 mg/L and 0-15,000 mg/L
- COD reactor has a wide range of preset temperatures and preset times
- Substantially reduces waste disposal – smaller reagent volumes and reduced danger of spills

 Compliant with EPA testing method



AQ4500 - Turbidity	
Cat. No.	Description
AQ4500	AQUAfast IV Turbidimeter and Calibration Kit
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
AC2T24	24 mm Replacement Turbidity Vials, 12 pack



COD Reagents Kits, Standards and Thermoreactor	
Cat. No.	Description
COD125	COD Thermoreactor, holds 25 vials
CODS01	COD Standard 1,000 mg/L (475 mL)
CODS10	COD Standard 10,000 mg/L (475 mL)
CODL00	 COD Test Kit, 0-150 ppm, 25 tests, EPA Approved
CODH00	 COD Test Kit, 0-1500 ppm, 25 tests, EPA Approved
CODHPO	 COD Test Kit, 0-15000 ppm, 25 tests, Not EPA compliant

# Thermo Scientific Orion AQUAfast® Chemistries

Cat. No.	Chemistries (EPA Status)	Meter Compatibility	Range (mg/L)	Reagent	No. of Tests
AC2002	Alkalinity -M	AQ2001, AQ4000	5 - 200	Tablet	100
AC4027	Aluminum	AQ4000	0.05 - 0.25	Ampoule	30
AC2027	Aluminum (EE)	AQ2020, AQ2005, AQ4000	0.05 - 0.30	Tablet	50
AC4010	Ammonia, ULR	AQ4000	0.10 - 3.00	Ampoule	30
<b>EPA</b> AC4012	Ammonia, LR (IP)	AQ4000	0.50 - 7.00	Ampoule	30
AC4011	Ammonia, HR	AQ4000	1.0 - 16.0	Ampoule	30
AC4P12	Ammonia Nitrogen	AQ4000	0.01 - 0.50	Powder	100
AC2012	Ammonia Nitrogen, LR	AQ2004, AQ4000	0.05 - 1.0 - 0.5 - 10.0	Tablet	50
AC4035	Bromine	AQ4000	0.75 - 9.00	Ampoule	30
AC2035	Bromine, LR (NR)	AQ2005	0.1 - 13.5	Tablet	100
AC4017	Chloride (IP)	AQ4000	2.0 - 40	Ampoule	30
AC2017	Chloride, LR	AQ2005, AQ4000	0.5 - 25	Tablet	50
AC4099	Chlorine Dioxide	AQ4000	0.80 - 12.00	Ampoule	30
AC2099	Chlorine Dioxide (NR)	AQ2020, AQ4000	0.04 - 2.8	Tablet	100
AC2071	Chlorine, Free (NR)	AQ2070, AQ2020, AQ4000	0.05 - 6.0	Tablet	100
<b>EPA</b> AC4P71	Chlorine, Free, DPD (A)	AQ2070, AQ4000	0.03 - 2.0	Powder	100
AC4070	Chlorine, Free & Total (A)	AQ4000	0.40 - 6.0	Ampoule	30
AC2070	Chlorine, Free & Total (NR)	AQ2070, AQ2020, AQ4000	0.05 - 6.0	Tablet	50
<b>EPA</b> AC2072	Chlorine, Total (A)	AQ2070, AQ2020, AQ4000	0.05 - 6.0	Tablet	100
<b>EPA</b> AC4P72	Chlorine, Total, DPD (A)	AQ2070, AQ4000	0.03 - 2.0	Powder	100
AC4P29	Copper, Bicinchoninate	AQ4000	0.05 - 5.00	Powder	100
AC2029	Copper, Biquinoline (EE)	AQ2005, AQ4000	0.05 - 5.0	Tablet	50
AC4029	Copper, Soluble (IP)	AQ4000	1.00 - 14.00	Ampoule	30
AC2065	Copper, Zinc (EE)	AQ2002, AQ4000	0.02 - 1.0	Tablet	50
<b>EPA</b> AC4006	Cyanide, Free	AQ4000	0.020 - 0.50	Ampoule	30
<b>EPA</b> AC4009	Fluoride, SPADNS	AQ4000	0.20 - 2.0	Ampoule	30
<b>EPA</b> AC2009	Fluoride, SPADNS (A)	AQ2009, AQ2020, AQ4000	0.01 - 2.0	Tablet	50
AC4030	Hydrazine	AQ4000	0.10 - 1.20	Ampoule	30
AC2030	Hydrazine (NR)	AQ2003, AQ4000	0.05 - 0.50	Tablet	30
AC2078	Iron	AQ2005, AQ4000	0.02 - 1.0/0.2 - 10	Tablet	100
AC4P78	Iron, FerroVer	AQ4000	0.02 - 3.00	Powder	100
AC4P79	Iron, TPTZ	AQ4000	0.02 - 1.80	Powder	100

Cat. No.	Chemistries (EPA Status)	Meter Compatibility	Range (mg/L)	Reagent	No. of Tests
AC4078	Iron, Total & Soluble (IP)	AQ4000	0.45 - 7.00	Ampoule	30
AC2055	Manganese, LR (NR)	AQ2003, AQ4000	0.05 - 4	Tablet	50
AC4P55	Manganese, MR	AQ4000	0.2 - 20.0	Powder	100
AC4055	Manganese, HR (IP)	AQ4000	1.0 - 30.0	Ampoule	30
AC4042	Molybdate	AQ4000	1.5 - 30.0	Ampoule	30
AC4P42	Molybdate, Mb, HR	AQ4000	0.3 - 40.0	Powder	100
AC2007	Nitrate, Nitrogen	AQ2007, AQ4000	1 - 40	Tablet	50
AC4004	Nitrate, LR as N	AQ4000	0.15 - 1.50	Ampoule	30
AC4005	Nitrate, MR as N	AQ4000	0.25 - 3.00	Ampoule	30
AC4007	Nitrate, HR as NO <sub>3</sub>	AQ4000	5.0 - 60.0	Ampoule	30
AC4046	Nitrite (IP)	AQ4000	0.080 - 0.800	Ampoule	30
<b>EPA</b> AC2046	Nitrite (A)	AQ2046	0.05 - 0.50	Tablet	100
<b>EPA</b> AC4P46	Nitrite, Nitrogen LR	AQ4000	0.03 - 0.350	Powder	100
AC4008	Oxygen, Dissolved	AQ4000	2.0 - 15.0	Ampoule	30
AC4048	Ozone, HR	AQ4000	0.20 - 2.50	Ampoule	30
AC2048	Ozone, LR (NR)	AQ2001	0.05 - 0.5	Tablet	100
AC2001	pH	AQ2020, AQ4000	6.5 - 8.4	Tablet	100
AC4095	Phosphate, LR as PO <sub>4</sub>	AQ4000	0.75 - 8.00	Ampoule	30
<b>EPA</b> AC2095	Phosphate, LR as PO <sub>4</sub> (A)	AQ2004, AQ4000	0.05 - 4.0	Tablet	50
AC4096	Phosphate, HR as PO <sub>4</sub>	AQ4000	5 - 80	Ampoule	30
AC2096	Phosphate, HR as PO <sub>4</sub>	AQ2003, AQ4000	10 - 100	Tablet	50
AC4P95	Phosphate, LR as P	AQ4000	0.07 - 2.50	Powder	100
AC2060	Silica, LR (EE)	AQ2002, AQ4000	0.05 - 4.0	Tablet	50
AC4060	Silica, HR	AQ4000	1.0 - 14.0	Ampoule	30
AC4P60	Silica, HR	AQ4000	1.0 - 75.0	Powder	100
AC2061	Silica, PO <sub>4</sub> Removal	AQ2002, AQ4000	NA	Tablet	100
AC4082	Sulfate, HR	AQ4000	5 - 70	Ampoule	30
AC2082	Sulfate, HR	AQ2005, AQ4000	5 - 200	Tablet	100
<b>EPA</b> AC4P82	Sulfate, HR (EE)	AQ4000	2 - 70	Powder	100
<b>EPA</b> AC4016	Sulfide, Soluble (IP)	AQ4000	0.20 - 3.0	Ampoule	30
AC2016	Sulfide, Soluble	AQ2004, AQ4000	0.05 - 0.50	Tablet	50
AC4065	Zinc, LR (IP)	AQ4000	0.30 - 3.0	Ampoule	30
AC2065	Zinc, Copper/Zinc	AQ2002, AQ4000	0.02 - 1.0	Tablet	50

## Key Information

EPA Status: **A** = Approved; **IP** = In Process; **NR** = No EPA Requirement; **EE** = EPA Equivalent Method

# Thermo Scientific Orion Potentiometric Titrators

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## Simple Acid/Base to High Performance Titration

### Ensure High Performance

Service options are now available for all titration products to get you up and running quickly and to make sure you are operating at the highest performance possible. See the Service Program Options section for details.

*Thermo Scientific Titration products, pH and Sodium electrodes are used at global Anheuser-Busch† locations to ensure water quality and beer formulas meet stringent QC specifications for alkalinity and sodium.*

*† Anheuser-Busch is a registered trademark of Anheuser-Busch Companies, Inc.*



### 960 Titrator

The 960 titrator is designed to overcome problems of sample throughput or analytical complexity. This versatile instrument can be used for classical titrations and automated analysis of any complex species measurable by ISE and pH electrodes. Utilizing 12 pre-programmed analysis techniques it is easy to operate.

The dispenser is a zero-dead-volume rotary reciprocating pump. Quick-release fittings make it fast and easy to disconnect one bottle and connect another. For maximum versatility, you can integrate up to eight auxiliary dispensers and an autosampler into one system.



### 950 ROSS® FASTQC™ Titrator

This economical yet versatile potentiometric titrator performs acid/base titrations, including non-aqueous samples, oxidation-reduction, precipitation and complexometric titrations using ion selective electrode and ROSS pH Technology to deliver fast, accurate titrations. Its unique Assured Accuracy feature can perform a gravimetric calibration of the entire dispensing system, making it easy to meet ISO 9000 and GLP requirements.

Specifications	960 / 950
mV	- 1600.00 to 1600.00 mV for both
Concentration	0.00001 to 99999 / -
pH Range	- 2.000 to 19.999 for both
pH Calibration Points	5 / 2
Temperature	- 5.0 to 105.0 °C for both
Power Requirement:	110/120/220/240 VAC, 50/60 Hz for both
Titration Modes	<b>960:</b> Preset pH Endpoint, Preset mV Endpoint, First Derivative Titration, Second Derivative Titration Single/Double/Multiple Known Subtraction, Multiple Analate Addition, Gran Function, Gran Predict, Standardize System, Help Analysis, pH Read <b>950:</b> Preset pH Endpoint, Preset mV Endpoint, First Derivative Titration
Methods Saved	Up to 20 / Up to 10
Display	Custom color vacuum fluorescent with 40 character prompt line / Custom color vacuum fluorescent with 17 character prompt line
Variable Speed Stirring Paddle	Yes for both
Input	Two BNC, two pin tip, dual banana jacks for PT-100 / Two BNC, two pin tip, ground, ATC power, RS232 style ATC probe
Output	<b>960:</b> 4 RS232 ports for connection to EA 940, printer, computer and balance; one 15 pin parallel port <b>950:</b> RS232, recorder
Dimensions (h.w.d.)	With Tower, 16" x 17" x 18" / Meter, 2" x 9" x 7.5"; Dispenser, 16" x 5.5" x 18"
Case	Splash and Chemical Resistant for both
Environmental Requirements	5 to 45 °C and 5 to 85% relative humidity for both
Autosampler Option	Yes / No
Agency Approvals	CE for both

## Ordering Information

Instruments	
Cat. No.	Description
<b>096000</b> 960 Titrator PLUS System	Complete with EA940 pH/ISE meter and 960 Titrator PLUS module. Includes base assembly, tower assembly, electrode holder, stirrer, 2 dispenser probes, anti-diffusion dispenser probe with 6 tips, tubing kit, calibration kit, cable (960 to EA940), reference tablet, 2 working solution bottles, 2 dip tubes and caps, line cords, and instruction manual. User selectable power requirement 100/115/220/240V ±10%
<b>096002</b> 960 Titrator PLUS Module	Same as 096000, but module does not include EA940 pH/ISE Meter
<b>095000</b> 950 FAST QC Titrator	950 titrator with printer, includes workstation, control unit, printer, printer paper, ROSS Sure-Flow combination pH electrode (Cat. No. 8172BNWP), cables, tubing, instruction manual and line cord, 110 V 60 Hz
<b>095001</b> 950 FAST QC	950 titrator with printer Same as 095000, but 220 V 60 Hz line cord
<b>095002</b> 950 FAST QC	950 titrator with printer Same as 095000, but without line cord
<b>095003</b> 950 FAST QC	950 titrator without printer Same as 095000, but without printer
<b>095004</b> 950 FAST QC	950 titrator without printer Same as 095003, but 220 V 60 Hz line cord
Accessories	
Cat. No.	Description
<b>0960KF</b>	0960KF Volumetric Karl Fischer Accessory. Provides the hardware for performing Karl Fischer moisture analysis on the 960 titrator. Includes KF vessel with drain valve, vessel top, KF electrode (Cat. No. 977900) and adapter, stirrer probe with paddle (Cat. No. 096019), glass desiccant side arm stopper, stand, septum, Teflon vessel O-ring, plugs, and O-rings
<b>096010</b>	Auxiliary Dispenser with tower, includes dispenser probes, tubing kit, interface cable, electrode holder, stirrer, power cord, and instruction manual, 115/230 V
<b>096011</b>	Auxiliary Dispenser without tower, includes dispenser probes, tubing kit, interface cable, power cord, and instruction manual, 115/230 V
Consumables	
Cat. No.	Description
<b>096014</b>	Tubing Kit, includes tube and connector for working solution bottle to dispenser; tube and connectors for dispenser to dispenser probe
<b>096016</b>	Dispenser Probes, 2 pack, and 1 roll of cleaning wire
<b>096017</b>	Anti-Diffusion Dispenser Probe, 1 dispenser probe with 6 replaceable tips. For low-level analysis or dense titrants
<b>096019</b>	Stirrer Probe and Paddle, fits electrode tower
<b>096021</b>	Paddles for 096019 stirrer probe, 3 pack
<b>096038</b>	Auxiliary Dispenser Calibration Kit, 8 mL capacity, 5 pack

Consumables	
Cat. No.	Description
<b>096039</b>	Working Solution Bottles, 475 mL, amber glass, 12 pack. Order Cat. No. 096025 separately.
<b>096045</b>	Working Solution Bottles, 475 mL, translucent plastic, 12 pack. Order Cat. No. 096025 separately.
<b>096025</b>	Dip Tube and Sealable Cap to fit working solution bottle, 6 pack
<b>096035</b>	Gas Absorption Cartridge fits top of working solution bottle. Absorbs carbon dioxide and moisture, absorbent not included
<b>0GLP30</b>	GLP Printer includes 960 interface cable, 110V
<b>0GLP31</b>	GLP Printer includes 960 interface cable, 220V
<b>0GLP35</b>	Replacement ribbon for 0GLP30/31 printers
<b>0GLP05</b>	Interface cable, 960 titrator to 0GLP30/31 printers
<b>950EPN</b>	Interface cable, 950 titrator to 0GLP30/31 printers
<b>0900A0</b>	900A Printer for 950 titrator, 110V
<b>0900A1</b>	900A Printer for 950 titrator, 220V
<b>0900A4</b>	Paper for 900A printer
<b>0900A6</b>	Battery pack for 900A printer
<b>55PR40</b>	Thermal Printer, 110V
<b>55PR49</b>	Thermal Printer, 220V
<b>55PR45</b>	Paper for 55PR40/49 printers, 5 pack
<b>960DPU</b>	Interface cable, 960 titrator to 55PR40/49 printers
<b>950DPU</b>	Interface cable, 950 titrator to 55PR40/49 printers
<b>0607CA</b>	607 Multi-channel electrode switchbox, 110V
<b>0607CI</b>	607 Multi-channel electrode switchbox, 220V
<b>096050</b>	Interface cable, 960 titrator to 607 switchbox
<b>020125</b>	110V power adapter for 950 titrator and 900A printer
<b>020130</b>	220V power adapter for 950 titrator and 900A printer
Software & Firmware	
Cat. No.	Description
<b>0960PC</b>	Interface cable, 960 titrator to computer
<b>DTPL20</b>	Data PLUS2 is an easy-to-use, menu-driven software (DOS based operating system) designed to collect, sort, format and print all of your titration data from the 960 titrator. Includes 5.25"; 3.5" software diskettes and instruction manual
<b>DTPL21</b>	Data PLUS2 Includes 5.25"; 3.5" diskettes, instruction manual, 0960PC interface cable, and adapter
<b>DTPL22</b>	Data PLUS2 Upgrade Kit includes 5.25"; 3.5" diskettes, instruction manual, 0960PC interface cable, adapter, and EPROMs
<b>238106-A01</b>	6.1 Rev. EPROM Upgrade Kit includes five EPROMs, installation and instruction sheet. (Required for use with the autosampler)

# Thermo Scientific Orion Karl Fischer Titrators

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## Fast, Accurate Moisture Analysis



### TURBO2® Volumetric Blending Titrator

The system comes with a powerful blender to break up and blend solid samples, such as food products or dry pharmaceuticals, assuring complete moisture extraction from the sample into solution with little or no sample preparation. The titrator has a fully automated fill and drain pumping system to minimize reagent handling. A large 720 mL vessel allows for multiple sample analysis as well as easy vessel access and cleaning. An optional water jacketed vessel is available to enhance moisture extraction in difficult samples.



### AF8 Volumetric Titrator

Rapid determination of moisture from 50 ppm to 100% moisture in a wide range of materials is possible with the AF8. The peristaltic pump's unique, continuous titrant dispensing system eliminates the inconvenience of refilling burettes. Top-entry vessel opening can accommodate a syringe needle for liquids or solid samples up to 23 mm across.



### AF7 Coulometric Titrator

Utilizing the extremely accurate technique of iodine generation, the AF7 coulometric titrator takes moisture measurement to new limits of accuracy and performance within a wide measuring range of 1 ppm to 100% H<sub>2</sub>O. It is a universal titrator for measuring both high and low moisture giving the user reliable results with unmatched speed of 20,000 micrograms (20 mg) of water titrated per minute.

Specifications	TURBO2 / AF8 / AF7
Method	Volumetric / Volumetric / Coulometric
High-Low Speed	-- / -- / 20 - 2 mg/min
Moisture Range	50 ppm to 100% H <sub>2</sub> O / 50 ppm to 100% H <sub>2</sub> O / 1 ppm to 100% H <sub>2</sub> O
Precision	0.5% at 25 mg H <sub>2</sub> O / 0.4% at 25 mg H <sub>2</sub> O / 0.7% at 10 mg H <sub>2</sub> O
End Point Potential	Variable / Variable / Fixed
Calibration Range	1 to 100 mg H <sub>2</sub> O / 1 to 100 mg H <sub>2</sub> O / --
End-Point Time/Level	1 to 30 seconds / 1 to 30 seconds / 0 to 50 µg/min
Background Correction	Yes / -- / Yes
Factor Range	0.1 to 100% for all
Blank Range	0 to 100 mg for all
Programmable Methods	3 stored methods, 2 default methods / 3 stored methods, 1 default method / 3 stored methods, 1 default method
Result Unit	ppm - % - mg for all
Display LCD	2 lines x 20 characters for all
Keyboard	Membrane, 18-function / Membrane, 22-function / Membrane, 24-function
Printer (Internal)	32 character, thermal / 32 character, thermal / 24 character, thermal
Statistics	Up to 25 tests for all
Stirrer Speeds	1000 to 7500 rpm / 200 to 1400 rpm / 200 to 1000 rpm
Interfaces	(2) RS232 for Balance and Computer for all
Balance Recognition	Orion, Mettler, Sartorius, Ohaus, Shimadzu, A&D, Oertling, Denver for all
Vessel Capacity	750 mL / 100/275 mL / 150/200 mL
Reagent Handling	Peristaltic Pump / Peristaltic Pump / Built-in Pump
Titration Vessel (h.w.d.)	27 x 23 x 35 (cm); 10.5 x 9 x 13.7 (in) / Same as TURBO2 / --
Elect. Console (h.w.d.)	20 x 37 x 34 (cm); 8 x 15 x 14 (in) / Same as TURBO2 / 24 x 54 x 35 (cm); 9 x 21 x 13 (in)
Agency Approval	CE for all

## Ordering Information

### TURBO2® Instrument

Cat. No.	Description
<b>319050001</b> TURBO2, Blending Volumetric Karl Fischer Titrator	Complete with built-in printer, 750 mL titration vessel, dual RS232 interface, line cord, spare silicone pump tubing and extra roll of printer paper, 105-120 VAC, 50-60 Hz
<b>319050000</b> TURBO2	Same as 319050001, but 210-240 VAC, 50-60 Hz

### TURBO2® Accessories

Cat. No.	Description
<b>319015012</b>	TURBO2 Drying Tubes, for protection against moisture, 3 pack
<b>319045010</b>	TURBO2 Printer Paper Rolls, 3 pack
<b>319050012</b>	TURBO2 750 mL Glass Titration Vessel
<b>319050014</b>	TURBO2 Platinum End-Point Detection Electrode
<b>319050016</b>	TURBO2 Blender Drive Belt
<b>319050018</b>	TURBO2 Water-Jacketed Titration Vessel
<b>319050020</b>	TURBO2 Silicone Pump Tubing, 1.0 mm bore, 5 pack
<b>319050024</b>	TURBO2 Marprene Pump Tubing, 1.0 mm bore, 5 pack
<b>319050026</b>	TURBO2 Shaft Seal Replacement Kit
<b>319050028</b>	TURBO2 Teflon Stopper and Teflon Encapsulated O-Ring
<b>319050030</b>	TURBO2 3.5 Ft Extension Cable From Console to Titration Vessel.

### AF8 Instrument

Cat. No.	Description
<b>319045001</b> AF8 Karl Fischer Volumetric Titrator	Complete with built-in printer, large & small titration vessels, small vessel adapter, dual RS232 interface, large & small stir bars, reagent & waste bottles, spare silicone pump tubing, and extra roll of printer paper, 105-120 VAC, 50-60 Hz
<b>319045000</b> AF8	Same as 319045001, but 210-240 VAC, 50-60 Hz

### AF8 Accessories

Cat. No.	Description
<b>319015012</b>	AF8 Drying Tubes, for protection against moisture ingress and sulfur dioxide emission, 3 pack
<b>319016000</b>	AF8 Small Titration Vessel, 100 mL capacity
<b>319016400</b>	AF8 Large Titration Vessel, 275 mL capacity
<b>319016800</b>	AF8 Silicone Pump Tubing, 1.0 mm bore, 5 pack
<b>319017200</b>	AF8 Marprene Pump Tubing, 1.0 mm bore, 5 pack
<b>319045010</b>	AF8 Printer Paper rolls, 3 pack
<b>319045012</b>	AF8 Platinum Electrode Module for titration end-point and solution level detection.
<b>319050030</b>	AF8 3.5 Ft Extension Cable From Console to Titration Vessel.

### AF7 Instrument

Cat. No.	Description
<b>319035001</b> AF7 Karl Fischer Coulometric Titrator	Complete with special high/low current titration vessel and electrodes, built-in vessel fill/drain pumping system, built-in printer, 2 reagent and 2 waste bottles, dual RS232 interface and accessory kit. 105-120 VAC, 50-60 Hz
<b>319035002</b> AF7	Same as 319035001, but 210-240 VAC, 50-60 Hz

### AF7 Accessories

Cat. No.	Description
<b>319035008</b>	AF7 Titration Vessel, including anode, cathode, sensing electrode, membrane kit, stirrer bar and ring, outer anode chamber, inner cathode chamber, and upper clamp ring
<b>319035010</b>	AF7 Anode Electrode
<b>319035012</b>	AF7 Cathode Electrode
<b>319035014</b>	AF7 End-Point Sensing Electrode
<b>319035016</b>	AF7 Titration Vessel Outer Chamber
<b>319035018</b>	AF7 Titration Vessel Inner Chamber/Top Plate
<b>319035020</b>	AF7 Membrane Kit, includes 1 membrane and 2 O-rings.
<b>319035022</b>	AF7 Cone Adapter for Anode & End-Point Electrode
<b>319035024</b>	AF7 Cone Adapter for Cathode Electrode
<b>319035026</b>	AF7 Cone Adapter for Vessel Outer Chamber (Anode Fill/Drain Cone)
<b>319035028</b>	AF7 Cone Adapter for Vessel Inner Chamber (Cathode Fill/Drain Cone)
<b>319035029</b>	AF7 Cone Adapter Washer, 10 pack
<b>319035030</b>	AF7 Desiccant Tubes, 3 pack
<b>319035032</b>	AF7 Titration Vessel Septum Discs, 10 pack
<b>319035034</b>	AF7 Printer Paper Rolls, 3 pack
<b>319035036</b>	AF7 Bottle Cap Assembly



# Thermo Scientific Orion AutoTration™-500 Autosampler

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## High Sample Throughput



### AutoTration™ - 500 Autosampler

The AutoTration - 500 autosampler performs analyses, calibrations and standardization procedures automatically. It improves data quality by using up to five rinse stations. Durable and corrosion resistant, the sealed electronics chassis and coated metal parts protect against the harshest chemical environments. The autosampler is available with either a 50 mL or 150 mL beaker rack and accessories. It is compatible with the 960 Titrator PLUS, for automated ISE techniques and titrations, and meters with autosampler capability.

www.thermo.com/water

Cat. No.	Description
<b>AT5050</b> AutoTration-500 Autosampler	Complete with 48-position beaker rack for 50 mL beakers, small electrode holder, drip tray, cable management system, BNC extension cable, stirrer extension cable, accessories package, interface cable, line cord, 50 pack of 50 mL plastic beakers, instruction manual, and warranty card, 115/220V.
<b>AT5150</b>	Same as AT5050, but with 28-position beaker rack, standard electrode holder, and 50 pack of 150 mL plastic beakers
<b>ATR050</b>	48-position beaker rack for 50 mL beakers
<b>ATR150</b>	28-position beaker rack for 150 mL beakers
<b>ASB050</b>	50 mL plastic beakers for 48-position rack, 50 pack
<b>ASB150</b>	150 mL plastic beakers for 28-position rack, 50 pack
<b>096S22</b>	45 mL plastic beakers for 48-position rack, 50 pack
<b>AT0STD</b>	Electrode holder, standard size for AT5150
<b>AT0050</b>	Electrode holder, small size for AT5050

AutoTration-500	Specifications	Benefit
Sample Capacity AT5050 / AT5150	45, 50 mL glass or plastic beakers / 28, 150 mL glass or plastic beakers	Choose the capacity right for your lab
Instrument Interface	RS232	–
Power Voltage	90-240 VAC, 50/60 Hz	Easy to install
50 mL beaker sold with autosampler	Polypropylene, 42 mm diameter	Chemically resistant
150 mL beaker sold with autosampler	Polypropylene, 57 mm diameter	Chemically resistant
Accuracy	± 1.0 mm in all axes	–
Agency Approvals	CE	Worldwide operation
Environmental Requirements	5 to 45 °C and 20 to 80% Relative Humidity	Durable
Compatible Instruments	960 Titrator PLUS (Rev 6.0)* Orion meters with autosampler setup options	Automate any analysis
Travel & resolution/precision Maximum X axis travel Minimum X axis resolution/precision Maximum Y axis travel Minimum Y axis resolution/precision Maximum Z axis travel Maximum Z axis resolution/precision Maximum Z axis clearance	510 mm Better than 0.1 mm 270 mm Better than 0.1 mm 160 mm Better than 0.1 mm 140 mm	–
Computer Interface	RS232	–
Power Consumption	100-240 VAC, 50/60 Hz, 100 VA	–

\* Must be this software revision or higher to be compatible



# Thermo Scientific Orion BOD AutoEZ®

## Automated BOD Analysis



### BOD AutoEZ®

- Reads 36 BOD samples in 15 minutes or less
- Automatically calculates results according to Standard Methods (5210) for the Examination of Water and Wastewater
- Customizable report and export options for interfacing with LIMS

The BOD AutoEZ utilizes robotics to measure dissolved oxygen and BOD (Biochemical Oxygen Demand) of water and wastewater. Its powerful software package and patented multiple probe design focuses on maximizing data quality and sample throughput, reducing labor costs, and ensuring consistent, accurate results.

### Unique Features

- Microsoft® Windows based software monitors and documents probe calibration, performance, noise and stability
- User selectable calculation protocols allow the customer to express dilutions as percent or volume and calculate seed correction from direct seed addition or seeded dilution water

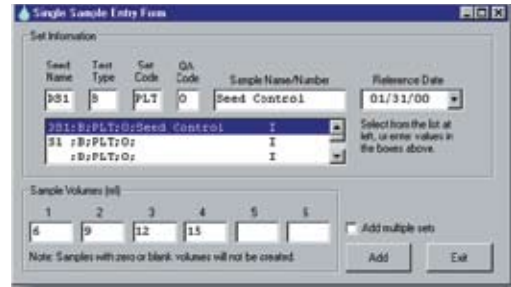
### Additional Features

- Automatic temperature compensation
- Built-in probe rinse system eliminates sample carryover

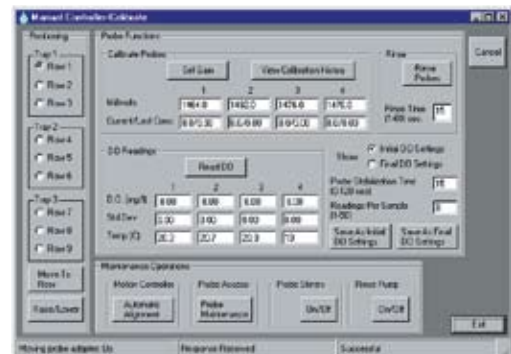
### Reporting Features

- User defined criteria for flagging outlying dilutions or sliding BOD readings
- Extracts and flags samples that exceed Quality Assurance guidelines
- Tracks and applies multiple seed correction factors as needed

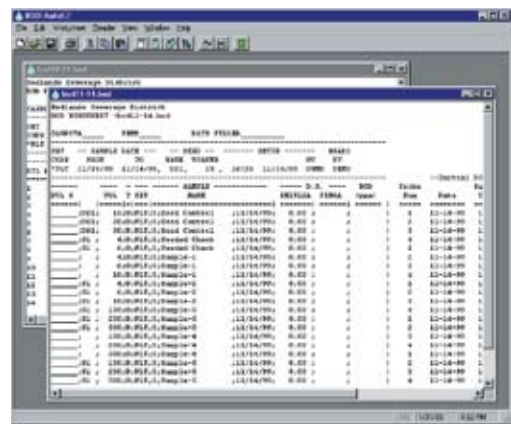
\* Registered trademark of Microsoft Corporation.



Sample Entry Form



Controller-Calibrator



Worksheet



Cat. No.	Description
10060020	BOD AUTO EZ Analyzer
10060040	BOD AUTO EZ BOD Bottle Trays
10060080	BOD AUTO EZ Replacement Drip Tray
10060003	BOD AUTO EZ Replacement DO Probe

 Compliant with EPA testing method

# Thermo Scientific Orion World Wide Support

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## Customer Service

Our knowledgeable customer service team is here to help service our distribution partners. Please contact us for questions, to place orders, quote pricing, or to track shipments.

**Toll-Free:** 800.225.1480

**Phone:** 978.232.6000

**Fax:** 978.232.6015 (US/Canada)

**Fax:** 978.232.6031 (Outside US/Canada)

**email:** (US/Canada)

info.water@thermofisher.com

**email:** (Outside US/Canada)

info.water.uk@thermofisher.com

## Technical Support

Need more information or application assistance?

Contact our Tech Support Experts (800) 225-1480.

## Specials and OEM's

Not finding exactly what you need?

Contact our OEM Team and we will provide a quote (800) 225-1480.

## Service & Repair

We offer warranty and non-warranty repair, calibration and validation services, and preventive maintenance. See the inside back cover, visit [www.thermo.com/water](http://www.thermo.com/water), or call (800) 225-1480 for more details.

One of the most important benefits that customers receive when purchasing one of our products is our unmatched customer service and technical support. The sale of a Thermo Scientific Orion product is only the first step in the ownership benefits we give all of our customers. Our commitment to owner satisfaction is first and foremost. We are dedicated to helping you solve your analytical problems.

We maintain a full-time staff of highly trained technical support chemists, as well as a field sales team of knowledgeable professionals. Our dealers are factory trained to assist you in the proper selection of products for your particular measurement needs.

Our technical service representatives will discuss your application needs and either recommend the appropriate equipment or help you solve any application-related problem using Thermo Scientific Orion products. You can gain instant access to our library of application solutions (compiled over more than 40 years) through a simple telephone call.



### Technical Seminar Programs

For corporate accounts and larger facilities, in-house technical seminars (featuring leading analytical scientists) are offered on a variety of measurement, application and new technology topics. Regional seminars (at a central location) on topics of broad interest, are also available through specific dealers.

### Certification of Performance

For a nominal fee, equipment operation can be verified through a stringent series of tests and calibrations. Documentation of test results and certification of performance will be provided, following GLP and ISO 9001 guidelines.

### Meter and Balance Calibration Certification

For a nominal fee, calibration certification is available for customers who require periodic verification for quality assurance and quality control programs. Certification of calibration is offered under GLP and ISO 9001 guidelines.

### In-Warranty and Out-of-Warranty Repair Service

In the unlikely event that service is required, our factory-trained product service technicians are committed to minimizing customer downtime through fast and effective repairs. We offer competitive pricing and a fast average repair time of five business days from date of receipt. Loaner instruments are available for many repairs (some carry a nominal charge). Customers outside the US and Canada please contact your local Thermo Scientific Orion products distributor.

### Preventive Maintenance Contracts

For a nominal fee, a factory-based preventive maintenance service plan is available to keep your instruments running at peak performance. Downtime is eliminated through the advance supply of a loaner instrument on most units. Certification of performance, under GLP and ISO 9001 guidelines, is provided on all preventive maintenance service contracts. (Available in U.S.A. only).

***Be sure to visit our website at [www.thermo.com/water](http://www.thermo.com/water).***

Our goal is to build the world's best source of electrode-based measurement information available on the Internet. We will also use our website to supply customers and dealers with timely information on new products, upcoming seminars and participation in major scientific meetings and exhibits.

# Thermo Scientific Orion Terms and Conditions

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## Minimum Order Requirements

The minimum dealer order requirement is \$225 (minimum customer order is \$40). An "order" is considered to be a purchase order for products to be shipped to a single location. International minimum order requirements may vary. Contact your international customer service specialist for details.

## Taxes

The price does not include any federal, state, or local property, license, privilege, sales, use, excise, gross receipt, value added, or other like taxes which may now or hereafter be applicable to, measured by, or imposed upon, or with respect to the transaction, the property, its sale, its value, or its use, or any services performed in connection therewith. Such taxes are for the account of the purchaser and the purchaser agrees to pay or reimburse any such taxes that Thermo Fisher Scientific or its contractors or suppliers are required to pay.

## Standard Terms of Payment

Standard terms of payment are net within 30 days from date of shipment unless otherwise specified on the front of the form.

## Delivery

Unless otherwise specified and accepted by Thermo Fisher Scientific, all products are delivered free carrier at FCA factory point of shipment. Freight and handling is prepaid and added to invoice unless otherwise specified or agreed to in writing.

## Concealed Damage and Return Policy

Except in the event of FCA destination shipments, Thermo Fisher Scientific will not participate in any settlement of claims for concealed damage. When shipment has been made on an FCA destination basis, the purchaser must unpack immediately and, if damage is discovered, must:

Not move the product from the point of examination. Retain shipping container and packing material. Notify the carrier's agent to make an inspection. Send Thermo Fisher Scientific a copy of the carrier's inspection report.

## Drop Shipments in U.S. and Canada

Drop shipments for dealers will be made at a 5% penalty to current dealer discount (5% loss of discount) for the items to be shipped. Standard drop shipment orders will be shipped within 5 business days of the order date, subject to stock availability. For faster processing, see rush orders below. Drop shipment is only available to U.S. and Canadian destinations.

## Rush Orders

Customers and dealers in the U.S.: Rush orders received before 12 Noon Eastern STD time will be shipped the same day. Rush orders received after 12 Noon Eastern STD time will be shipped the next business day. Customers and dealers in Canada: Rush orders will be shipped within 2 business days. Customers and dealers outside the U.S. and Canada: Contact your international dealer for rush order scheduling. All rush orders carry a \$50 incremental charge per order. FCA: Factory:.. Freight charges are prepaid and added or freight collect. All rush order processing is subject to stock availability.

## Restocking Charge

Permission to return new, excess inventory must be obtained prior to return within thirty days of original shipment.

If any item authorized to be returned for credit as a result of an incorrect purchase without a reorder, a 25% restocking charge of the price paid for the product will be made. (International customer's restocking fee of 25% will be off the international price).

Only new (in-the-box) goods may be returned within 30 days of shipment from Thermo Fisher Scientific. Older items, service parts, and discontinued items cannot be returned for credit.

## Short Shipments

Thermo Fisher Scientific must be notified within 30 days of receipt of invoice of any item or billing discrepancies. All substantiated claims of short shipments will be remedied by a credit memo and a new

order placed for short shipment. Any shipment discrepancy claimed after 30 days of invoice date will not be honored and credit will not be issued.

## To Return Goods

Permission to return merchandise purchased from Thermo Fisher Scientific must be obtained prior to return.

Contact within 30 days of receipt of goods for a return authorization number.

## Hazardous Materials

Some materials are designated corrosive and/or oxidizer by DOT and IATA. Some products may require special labeling and handling. Carriers may add additional freight charges for handling/transporting these materials. Consolidating such material with other products may be prohibited. Additional freight charges will be billed per the Thermo Fisher Scientific shipping terms. Be sure to advise Thermo Fisher Scientific of shipping instructions for these hazardous materials to reduce your freight costs.

## Force Majeure

Thermo Fisher Scientific shall not be liable for failure to perform or for delay in performance due to fire, flood, strike, or other labor difficulty, act of God, act of any governmental authority or of the purchaser, riot, embargo, fuel or energy shortage, wrecks or delays in transportation, inability to obtain necessary labor, materials, or manufacturing facilities from usual sources, or due to any cause beyond its reasonable control. In the event of a delay in performance due to any such cause, the date of delivery or time for completion of performance will be extended by a period of time reasonably necessary to overcome the effect of such delay.



# Thermo Scientific Orion Warranties

## Lab Products Warranty

From a comprehensive, uptime-focused warranty to an assortment of start-up, repair and calibration services, we have a support solution to ensure you get the most from your laboratory products warranty.

## Service Details

Buyer should return the warranty card to Seller and retain proof of purchase. Seller warrants that during the warranty period described below, the Products will operate substantially in conformance with its published specifications and be free from defects in material and workmanship, when subjected to normal, proper and intended usage and not subjected to accident, alteration, misuse, abuse, breakage, or repairs attempted by unauthorized persons. The warranty is void if the Product has been abused, misused, or repairs have been attempted by unauthorized persons.

The warranties contained herein are for Products sold and/or installed by Seller or its authorized dealers.

In the event of failure within the warranty period, Seller will at Seller's option, repair or replace product not conforming to this warranty. A return authorization number must be obtained from the technical service department before returning any product for in-warranty repair or replacement. There may be additional charges to Buyer, including freight, for warranty service performed in some countries. For service, call Thermo Fisher Scientific (or its authorized dealer outside the United States and Canada). Thermo Fisher Scientific reserves the right to ask for proof of purchase, such as the original invoice or packing slip.

Field Service is available on the BOD AutoEZ. Contact our Field Service department for details on quotations, service, and other field service-related activities.

The following warranty periods apply to the following products during the period listed below starting from the date of purchase by Buyer or from the date of shipment from Thermo Fisher Scientific, whichever is earlier:

### Thirty-six months from date of purchase by Buyer (or forty-two months from date of shipment from Thermo Fisher Scientific)

All Orion Star Series pH, ISE, DO and Conductivity Meters, Waterproof Meters (630, 635, 830A, 835A, 260A, 261S, 265A, 266S, 130A, 131S, 135A, 136S), Conductivity Meters (105Aplus, 115Aplus, 125Aplus, 145Aplus, 150Aplus and 162A), PerpHect pH and pH/ISE Meters (310, 320, 330, 350, 370) pH and pH/ISE Meters (210Aplus, 230Aplus, 250Aplus, 290Aplus, 410Aplus, 420Aplus, 520Aplus, 525Aplus, 710Aplus, 720Aplus and 920Aplus), pHuture MMS Meters (535A and 555A), pH/Conductivity Meter (550A), Dissolved Oxygen Meters (805Aplus, 810Aplus, 850Aplus and 862A).

### Twenty-four months from date of purchase by Buyer (or thirty-six months from date of shipment from Thermo Fisher Scientific)

ROSS Ultra Electrodes, AQUAfast IV Colorimeters, AQUAfast IV Turbidimeter, 925 Flash Titrator, DuraProbe Conductivity Cells and Series 800 Dissolved Oxygen Probes. Russell RL060P pH Meter and RL060C Conductivity Meter.

### Twelve months from date of purchase by Buyer (or eighteen months from date of shipment from Thermo Fisher Scientific)

Laboratory pH Meters (301, 611 and 940), pHuture pH Meters (610 and 620), Smart Chek Meters, Sage Pumps, Cahn Balances, 930 Ionalyzer, 950 ROSS FAST QC Titrator, 960 Titrator PLUS, Karl Fischer Titrators, Autosamplers, pHuture Conversion Box, 607 Switchbox, rf link, AQUAfast II Colorimeters.

Ion Selective Electrodes, ionplus Electrodes, ROSS Electrodes, Sure-Flow Electrodes, PerpHect Electrodes, AquaPro Professional Electrodes, No Cal pH Electrodes, Standard pH Electrodes, TRIS Calomel pH Electrodes, KNIpHE Electrodes, ORP Triode (9180), ORP Electrodes (9678 and 9778), pHuture pH Probe (616500) and pHuture MMS Triode and Quatrode (616600 and 617900), Double Junction pH Electrodes (9102DJWP and 9110DJWP), DO Probe (9708), 2-Electrode Conductivity Cells, Temperature Probes and Compensators (except those models noted).

The 93 and 97 ionplus Series Sensing Modules are warranted to give six months of operation if placed in service before the date indicated on the package, except 9307 and 9707 Nitrate Modules are warranted to give ninety days of operation if placed in service before the date indicated on the package.

### Six months from date of purchase by Buyer (or twelve months from date of shipment from Thermo Fisher Scientific)

Flash Titration Probe (092518), pHuture Electrode (615700), pHuture MMS Pentrode, Quatrode and Triode (617500, 617800, 615800), Low Maintenance Triode (9107BN), ORP Low Maintenance Triode (9179), and PerpHect Low Maintenance Triode (9207BN), Waterproof Triode (9107WP, 9107WL, 9109WL and 9109WP), Basic pH Electrodes (9142BN, 9146BN, and 9147BN), Basic ATC Probe (917004), Basic Conductivity Probe (014005), Orion Star Series Low Maintenance Triode (9107BNMD, 9107WMMMD, and 9107WLMD), Double Junction pH Electrode (9156DJWP), QuiKcheK Meters and Micro Electrodes.

### Three months from date of purchase by Buyer (or six months from date of shipment from Thermo Fisher Scientific)

930 Ionalyzer, 950 ROSS FAST QC Titrator and 960 Titrator PLUS Pump and Auxiliary Dispensers.

Economy Electrodes, 9105, 9106, 9115, 9116, 9125, 9126, 9135, 9136, 9206. Warranty also includes failure for any reason (excluding breakage), except abuse, provided the electrode is not used in solutions containing silver, sulfide, TRIS, protein, perchlorate, or hydrofluoric acid; or in solutions more than 1 Molar in strong acid or base at temperatures above 50 °C.

### "Out-of-Box" Warranty - Should any of the following products fail to work when first used, contact Seller immediately for replacement.

Solutions, Standards, Reagents, Cables, Line Adapters, Printers, Software, Cases, Stands, Probe Membranes, AQUAfast Test Strips, and general accessories.

For products in the catalog not listed in this warranty statement, please visit our website at: [www.thermo.com/water](http://www.thermo.com/water).

THE WARRANTIES DESCRIBED ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER STATUTORY, EXPRESS OR IMPLIED INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND ALL WARRANTIES ARISING FROM THE COURSE OF DEALING OR USAGE OF TRADE. THE BUYER'S SOLE AND EXCLUSIVE REMEDY IS FOR REPAIR OR REPLACEMENT OF THE NON-CONFORMING PRODUCT OR PART THEREOF, OR REFUND OF THE PURCHASE PRICE, BUT IN NO EVENT SHALL THERMO FISHER SCIENTIFIC (ITS CONTRACTORS AND SUPPLIERS OF ANY TIER) BE LIABLE TO THE BUYER OR ANY PERSON FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES WHETHER THE CLAIMS ARE BASED IN CONTRACT, IN TORT (INCLUDING NEGLIGENCE), OR OTHERWISE WITH RESPECT TO OR ARISING OUT OF THE PRODUCT FURNISHED HEREUNDER. REPRESENTATION AND WARRANTIES MADE BY ANY PERSON, INCLUDING ITS AUTHORIZED DEALERS, REPRESENTATIVES AND EMPLOYEES OF THERMO FISHER SCIENTIFIC WHICH ALTER OR ARE IN ADDITION TO THE TERMS OF THIS WARRANTY SHALL NOT BE BINDING UPON THERMO FISHER SCIENTIFIC UNLESS IN WRITING AND SIGNED BY ONE OF ITS OFFICERS.

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### Key Information

\*\* Visit [www.thermo.com/water](http://www.thermo.com/water) for additional product information

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**Key Information**

\*\* Visit [www.thermo.com/water](http://www.thermo.com/water) for additional product information



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# Thermo Scientific Orion Service Program Options

Our leadership shows up in everything we do including:

- **Minimized ramp up time**
- **Ongoing support**
- **Flexible data reporting and analysis**
- **Low cost of ownership**
- **Comprehensive support solutions for all phases of the product life cycle**
- **Immediate access to experts worldwide**

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Go to [thermo.com/water](http://thermo.com/water) for comprehensive warranty and service option information.

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**Chesterfield County WWTP  
Wastewater Treatment Plant**

Description	Cat. No.	2 Year Extended Warranty	3 Year Extended Warranty	Start-up	Preventative Maintenance
960 Titrator	096000	096000EXT2	096000EXT3	--	--
960 Titrator	096002	096002EXT2	096002EXT3	--	--
TURBO2	319050001	319050EXT2	319050EXT3	TUR2SU	TUR2PM
TURBO2 (220V)	319050000	319050EXT2	319050EXT3	--	--
AF8	319045001	319045EXT2	319045EXT3	0AF8SU	0AF8PM
AF8 (220V)	319045000	319045EXT2	319045EXT3	--	--
AF7	319035001	319035EXT2	319035EXT3	0AF7SU	0AF7PM
AF7 (220V)	319035002	319035EXT2	319035EXT3	--	--
AF7LC	319040001	319040EXT2	319040EXT3	0AF7SU	0AF7PM
AF7LC (220V)	319040000	319040EXT2	319040EXT3	--	--
BOD AutoEZ	10060020	--	--	CBODEZ00SU	CBODEZ00PM

**Preventative Maintenance (PM)** – contracts and Start-up/Training (SU) are available in N. America only and are represented by Catalog Numbers ending in PM and SU.

**Extended Warranties (EXT)** – are available world wide and are represented by Catalog Numbers ending in EXT2 (2 year) and EXT3 (3 year).

Cat. No.	Star Series Calibration and Validation
111200CAL	3-Star pH Benchtop
121200CAL	3-Star pH Portable
111300CAL	3-Star DO Benchtop
121300CAL	3-Star DO Portable
111400CAL	3-Star Cond Benchtop
121400CAL	3-Star Cond Portable
111500CAL	4-Star pH/ISE Benchtop
121500CAL	4-Star pH/ISE Portable
111600CAL	4-Star pH/DO Benchtop
121600CAL	4-Star pH/DO Portable
111700CAL	4-Star pH/Cond Benchtop
121700CAL	4-Star pH/Cond Portable
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