

Air (Water-saturated Air) Calibration

1. Press the **f1 (cal)** key to start the calibration.
 - a. If more than one channel is displayed in the measurement mode, press the **p** or **q** key to highlight DO/RDO-Channel and press the **f2 (select)** key.
2. Press the **p** or **q** key to highlight Air and press the **f3 (select)** key.
3. Prepare the DO sensor and calibration sleeve and allow them to reach equilibrium.
4. When the DO sensor and calibration sleeve are ready, press the **f3 (start)** key.
5. Wait for the dissolved oxygen value on the meter to stabilize.
 - a. With a polarographic DO sensor, 102.3% will be displayed when the reading stabilizes.
 - b. With an RDO optical DO sensor, 100.0% will be displayed when the reading stabilizes.
6. Press the **f2 (cal done)** key to save and end the calibration.
7. The meter will display the calibration summary and export the data to the calibration log.
Press the **f1 (meas)** key to proceed to the measurement mode or press the **f2 (print)** key to export the calibration data to a printer or computer.

Water (Air-saturated Water) Calibration

1. Press the **f1 (cal)** key to start the calibration.
 - a. If more than one channel is displayed in the measurement mode, press the **p** or **q** key to highlight DO/RDO-Channel and press the **f2 (select)** key.
2. Press the **p** or **q** key to highlight Water and press the **f3 (select)** key.
3. Prepare the DO sensor and 100% air-saturated water and allow them to reach equilibrium.
 - a. Use plastic paraffin film to seal the open area between the DO sensor and vessel containing the 100% air-saturated water.
4. When the DO sensor and calibration apparatus are ready, press the **f3 (start)** key.
 - a. If using a stirrer probe, the stirrer probe will start stirring when the **f3 (start)** key is pressed and stop stirring when the reading stabilizes.
5. Wait for the dissolved oxygen value on the meter to stabilize.
 - a. 100.0% will be displayed when the reading stabilizes.
6. Press the **f2 (cal done)** key to save and end the calibration.
7. The meter will display the calibration summary and export the data to the calibration log.
Press the **f1 (meas)** key to proceed to the measurement mode or press the **f2 (print)** key to export the calibration data to a printer or computer.

Manual (Winkler) Calibration

1. Press the **f1 (cal)** key to start the calibration.
 - a. If more than one channel is displayed in the measurement mode, press the **p** or **q** key to highlight DO/RDO-Channel and press the **f2 (select)** key.
2. Press the **p** or **q** key to highlight Manual and press the **f3 (select)** key.
3. Prepare the DO sensor and calibration solution and allow them to reach equilibrium.
 - a. Use plastic paraffin film to seal the open area between the DO sensor and vessel containing the calibration solution.
4. When the DO sensor and calibration apparatus are ready, press the **f3 (start)** key.
 - a. If using a stirrer probe, the stirrer probe will start stirring when the **f3 (start)** key is pressed and stop stirring when the reading stabilizes.
5. Wait for the dissolved oxygen value on the meter to stabilize and perform one of the following actions:
 - a. Press the **f2 (accept)** key to accept the displayed dissolved oxygen value.
Or
 - b. Press the **f3 (edit)** key to access the popup number entry screen and manually enter the dissolved oxygen value.
 - i. Press the **p**, **q**, **t** or **u** key to highlight a number or decimal point, press the **f3 (enter)** key to select the highlighted item and repeat until the desired value is shown at the top of the screen.
 - ii. Press the **f2 (done)** key to save the value and exit the number entry screen.
6. Press the **f2 (cal done)** key to save and end the calibration.
7. The meter will display the calibration summary and export the data to the calibration log. Press the **f1 (meas)** key to proceed to the measurement mode or press the **f2 (print)** key to export the calibration data to a printer or computer.

Set Zero Calibration

An Air (water-saturated air) calibration or Water (air-saturated water) calibration must be completed before a Set Zero calibration can be performed.

Prepare a sodium sulfite solution by dissolving about 15.0 grams of Na_2SO_3 in about 250 mL of distilled water. Transfer the solution to a BOD bottle or flask and use plastic paraffin film to seal the bottle. A small amount of cobalt salt can be added to the sodium sulfite solution to act as an indicator and change color when the sodium sulfite solution no longer has zero oxygen content.

1. Press the **f1 (cal)** key to start the calibration.
 - a. If more than one channel is displayed in the measurement mode, press the **p** or **q** key to highlight DO/RDO-Channel and press the **f2 (select)** key.
2. Press the **p** or **q** key to highlight Set Zero and press the **f3 (select)** key.
3. Prepare the DO sensor and zero oxygen solution and allow them to reach equilibrium.
 - a. Use plastic paraffin film to seal the open area between the DO sensor and vessel containing the calibration solution.
4. When the DO sensor and calibration apparatus are ready, press the **f3 (start)** key.
 - a. If using a stirrer probe, the stirrer probe will start stirring when the **f3 (start)** key is pressed and stop stirring when the reading stabilizes.
5. Wait for the dissolved oxygen value on the meter to stabilize.
 - a. 0.0% will be displayed for P2 when the reading stabilizes.
6. Press the **f2 (cal done)** key to save and end the calibration.
7. The meter will display the calibration summary and export the data to the calibration log. Press the **f1 (meas)** key to proceed to the measurement mode or press the **f2 (print)** key to export the calibration data to a printer or computer.

Measurement Procedure

Prepare the sensors according to the instructions in the sensors manuals. Connect all electrodes, sensors and probes to be used to the appropriate meter inputs. Make sure the sensors are recently calibrated and working correctly.

Ensure the meter measurement mode is set to the desired measurement parameter. For Star A216 meters, press the **f3 (channel)** key until the desired channel or channels are shown in the measurement mode.

1. Rinse the sensors with distilled water or appropriate solution, blot gently with a lint-free tissue to remove excess water and place into the sample.
2. Start the measurement and wait for the reading to stabilize or reach the predefined time.
 - a. Auto-Read: Press the **measure (esc)** key to start the measurement. If using a stirrer probe, the stirrer probe will start stirring when the **measure (esc)** key is pressed and stop stirring when the measurement stabilizes.
 - b. Continuous: Measurements will start immediately when in the measurement mode. If using a stirrer probe, press the **stirrer** key to start and stop stirring.
 - c. Timed: Measurements will start immediately when in the measurement mode. If using a stirrer probe, press the **stirrer** key to start and stop stirring.
3. Once the measurement is stable or reaches the set time, record all applicable parameters.
 - a. Auto-Read: Once the measurement is stable, it will be locked and held on the display and the **AR** icon will remain solid. If the data log function is enabled, the measurement will be exported to the data log.
 - b. Continuous: The flashing **Stabilizing** icon will update to the solid **Ready** icon when the measurement is stable. If the data log function is enabled, press the **log/print** key to export the measurement to the data log.
 - c. Timed: Measurements will be recorded at the predefined time interval. If the data log function is enabled, the **<** icon will be shown when each time interval has elapsed and the measurement is exported to the data log.
4. Remove the sensors from the sample, rinse with distilled water or appropriate solution, blot gently with a lint-free tissue to remove excess water and place into the next sample.
5. Repeat steps 2 through 4 for all samples. When all samples have been measured, store the sensors according to the instructions in the sensor manuals.

7

CHAPTER 7 Data Transfer and Software Updates

Data Storage and Transfer Settings

Meter settings that affect data storage and transfer include the measurement read type, export data settings and data log setting. The date and time settings should also be reviewed and update as needed.

Measurement Read Type Setting

The selected read type determines when the meter sends measurements to the data log, if the data log is enabled in the setup menu, and when the meter exports measurements to a printer or computer, if a printer or computer is properly connected to the meter and export data settings are enabled in the setup menu. Select from Auto-Read, continuous and timed read types.

Auto-Read

Press the **measure (esc)** key to start a measurement. The **AR** icon blinks as the changing value stabilizes. When the measurement is stable, the **AR** icon stops blinking and the measurement is locked on the display until the **measure (esc)** key is pressed again. When the data log and export data settings are enabled, the stable measurement is automatically saved to the data log and exported to a printer or computer.

Continuous

Measurement values are continuously updated on the display and the **Stabilizing** or **Ready** icon indicates the measurement stability status. When the data log and export data settings are enabled, press the **log/print** key to save a measurement to the data log and export it to a printer or computer.

Timed

Measurement values are continuously updated on the display and the **Stabilizing** or **Ready** icon indicates the measurement stability status. When the data log and export data settings are enabled, measurements are saved to the data log and exported to a printer or computer at the selected time intervals from 3 seconds (00:00:03) to 24 hours (24:00:00).

To Set Measurement Read Type:

1. In the measurement mode, press the **setup** key to access the main setup menu.
2. Press the **p**, **q**, **t** or **u** key to highlight pH Channel, pH/ISE Channel, COND Channel or DO/RDO Channel and press the **f3 (select)** key.
3. Press the **p** or **q** key to highlight Mode and Settings and press the **f3 (select)** key.
4. Press the **p** or **q** key to highlight Read Type and press the **f3 (select)** key.
5. Press the **p** or **q** key to highlight Auto, Continuous or Timed and press the **f3 (select)** key to set the desired measurement mode.
 - a. If Timed is selected, press the **t** or **u** key to highlight the hours (00:00:00), minutes (00:00:00) or seconds (00:00:00).
 - b. Press the **f3 (edit)** key to access the popup number entry screen.
 - c. Press the **p**, **q**, **t** or **u** key to highlight a number, press the **f3 (enter)** key to select the number and repeat until a two digit value is shown at the top of the screen.
 - d. Press the **f2 (done)** key to save the value and exit the number entry screen.
 - e. Repeat until the correct time interval is entered for the hours, minutes and seconds.
Time intervals from 3 seconds (00:00:03) to 24 hours (24:00:00) can be entered.
6. Press the **f1 (back)** key to navigate out of the menu and then press the **measure (esc)** key to return to the measurement mode.

Data Log Setting

To save up to 2000 measurement sets to the meter data log, turn the data log setting on in the setup menu.

1. In the measurement mode, press the **setup** key to access the main setup menu.
2. Press the **p**, **q**, **t** or **u** key to highlight Settings and press the **f3 (select)** key.
3. Press the **p** or **q** key to highlight Data Log and press the **f3 (select)** key.
4. Press the **p** or **q** key to highlight On and press the **f3 (select)** key.
5. Press the **f1 (back)** key to navigate out of the menu and press the **measure (esc)** key to return to the measurement mode.

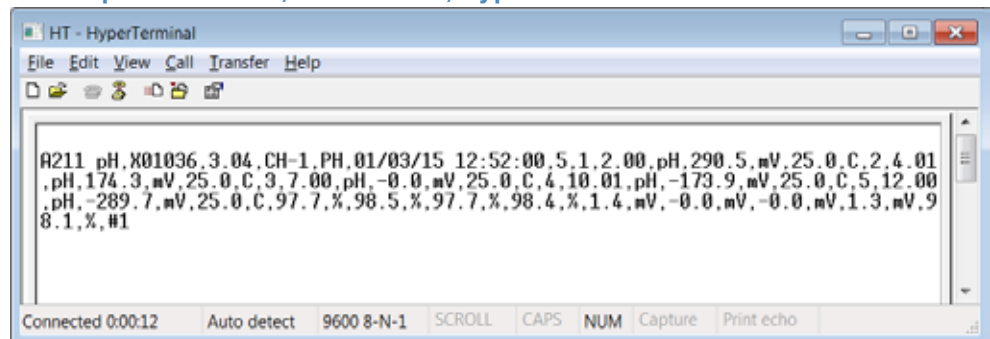
Export Data Settings

To transfer measurements to a computer or printer, turn the export data function on in the setup menu and update export settings to match the external device settings, including the baud rate. The default meter communication connection is RS232 and the meter will automatically detect and adjust the connection setting when an active USB cable is connected with the meter.

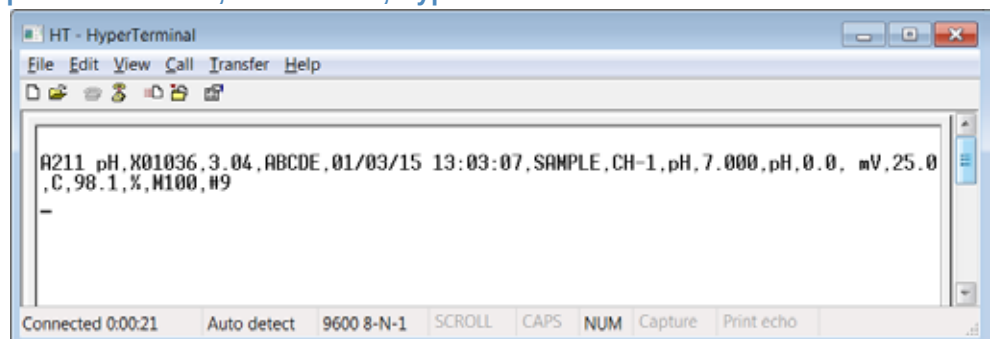
1. In the measurement mode, press the **setup** key to access the main setup menu.
2. Press the **p**, **q**, **t** or **u** key to highlight Settings and press the **f3 (select)** key.
3. Press the **p** or **q** key to highlight Export Data and press the **f3 (select)** key.
4. Press the **p** or **q** key to highlight Printing and press the **f3 (select)** key. Press the **p** or **q** key to highlight On and press the **f3 (select)** key.
5. Press the **p** or **q** key to highlight Data Format and press the **f3 (select)** key. Press the **p** or **q** key to highlight Printer or PC (CSV) and press the **f3 (select)** key.
6. Press the **p** or **q** key to highlight Comm Config and press the **f3 (select)** key. Press the **p** or **q** key to highlight 1200, 2400, 4800, 9600, 19200 or 38400 as the meter baud rate and press the **f3 (select)** key.
7. Press the **f1 (back)** key to navigate out of the menu and press the **measure (esc)** key to return to the measurement mode.

Data Transfer Examples

5 Point pH Calibration, CSV Format, HyperTerminal View:



pH Measurement, CSV Format, HyperTerminal View:



5 Point pH Calibration, Printer Format:

```

-----
Thermo Scientific (c) 2011
A211 pH
Meter S/N          X01036
SW Rev             3.04
--Calibration Report--
PH
12/27/14 16:43:00
Point 1
pH                 2.00 pH
mV                 290.5 mV
Temperature        25.0 C
Point 2
pH                 4.01 pH
mV                 174.3 mV
Temperature        25.0 C
Point 3
pH                 7.00 pH
mV                 0.0 mV
Temperature        25.0 C
Point 4
pH                 10.01 pH
mV                 -173.6 mV
Temperature        25.0 C
Point 5
pH                 12.00 pH
mV                 -289.4 mV
Temperature        25.0 C
Slope1             97.7 %
Slope2             98.5 %
Slope3             97.5 %
Slope4             98.4 %
E1                 1.5 mV
E2                 0.0 mV
E3                 0.0 mV
E4                 1.7 mV

Average Slope      98.0 %
Calibration        #3

Operator
Signature_____

```

pH Measurement, Printer Format:

```

-----
Thermo Scientific (c) 2011
A211 pH
Meter S/N          X01036
SW Rev             3.04
User ID  ABCDE
01/03/15 12:58:34
SampleID  SAMPLE

pH                 7.000 pH
mV                 0.0 mV
Temperature        25.0 C
Slope              98.1 %
Method#            M100
Calibration        #1

Operator_____
Signature_____

```

Printer Compatibility and Requirements

Orion Star A210 series benchtop meters can print directly to the Orion Star series inkjet printer, Catalog Number 1010006. Measurement and calibration data sent from the meter to the Orion Star series inkjet printer is automatically formatted to fit the paper width when the printer data format is selected within the Export Data setting. The Orion Star series inkjet printer has a 9600 baud rate and it is packaged with the RS232 printer cable required to interface an Orion Star A210 series meter to this printer.



The baud rate of Orion Star A210 series meters can be set to 1200, 2400, 4800, 9600, 19200 or 38400 for communication to different printers. The fixed meter settings are:

Number of Data Bits:	8
Stop Bits:	1
Parity:	None
Flow Control:	XON/XOFF

The meter will send measurements and calibration data to the printer if the printer option is turned on in the setup menu. Alternatively, measurements and calibration data can be sent to the data log and calibration log. From the data log and calibration log, the operator can choose to print a single data log point, a range of data log points or the entire data log.

Computer Compatibility and Requirements

The Orion Star A210 series meters can send measurements and calibration data to a computer in a comma delimited format that is easy to parse in computer programs like Excel.

The baud rate of Orion Star A210 series meters can be set to 1200, 2400, 4800, 9600, 19200 or 38400. The fixed meter settings are:

Number of Data Bits:	8
Stop Bits:	1
Parity:	None
Flow Control:	XON/XOFF

The meter will send measurements and calibration data to the computer if the printer option is turned on in the setup menu. Alternatively, measurements and calibration data can be sent to the data log and calibration log. From the data log and calibration log, the operator can chose to print a single data log point, a range of data log points or the entire data log.

The computer must be up-to-date with the latest Windows updates installed and have .NET framework version 4.0 with the latest updates.

All computer screen savers and power management settings should be disabled when the meter is interfaced with the computer. The computer should not go into sleep/standby mode while the meter is transferring data. Laptop computers should be plugged into a power supply, running on battery power is not recommended.

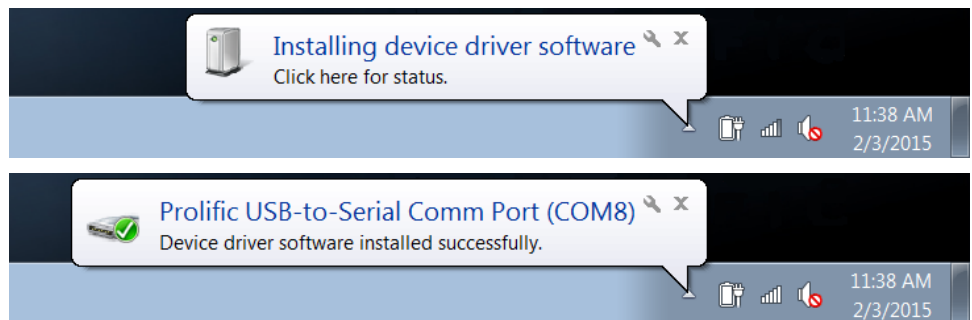
Three computer cables can be used to interface the Orion Star A210 series benchtop meters with a computer – the Orion Star series USB-to-Serial computer cable (Cat. No. 1010005), Orion Star series RS232 computer cable (Cat. No. 1010053) or a standard Mini B USB to USB computer cable.

Computer Cable	Meter Connection	Computer Connection	Driver Required
USB-to-Serial Computer Cable, Cat. No. 1010005	RS232	USB	Yes
RS232 Computer Cable, Cat. No. 1010053	RS232	RS232	No
USB Computer Cable (standard Mini B USB to USB cable)	USB (Mini B)	USB	Yes

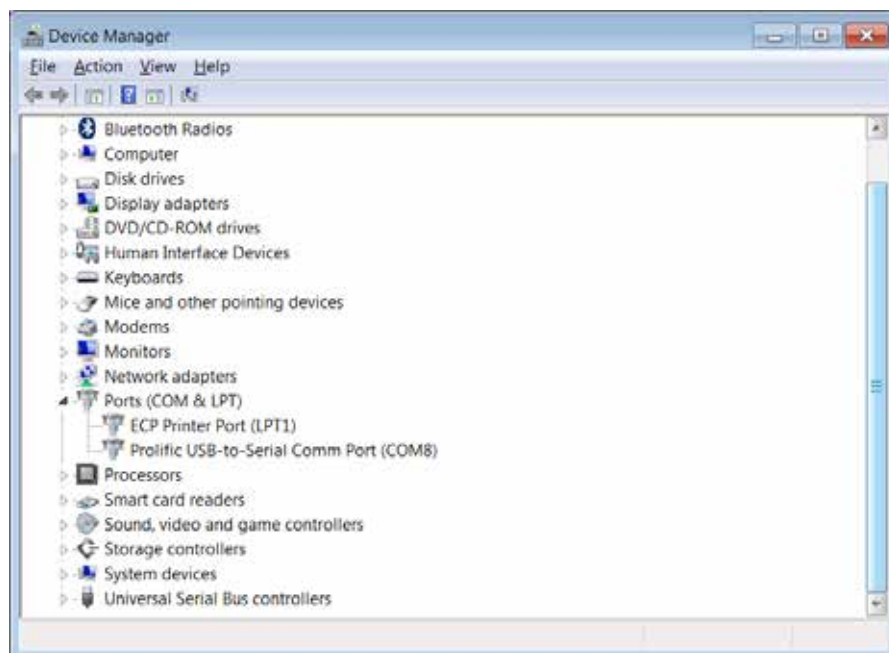
Using the USB-to-Serial Computer Cable

Turn on the power to the meter and connect the USB-to-Serial computer cable first to the meter and then to the computer. The USB-to-Serial driver must be installed when the meter will be interfaced with a computer using the USB-to-Serial computer cable. The USB-to-Serial driver is compatible with Microsoft® Windows® XP, Windows Vista®, Windows 7 and Windows 8 operating systems.

1. Connect the meter to a wall outlet using the universal power adapter (catalog number 1010003) or install four AA batteries and power on the meter.
2. Connect the USB-to-Serial computer cable first to the meter's RS232 input and then to the computer's USB input.
3. After the USB-to-Serial computer cable is connected to the computer, the computer will automatically identify the device and install the driver. Once the device driver is done installing, the USB-to-Serial computer cable can be used to transfer data from the meter to the computer using Orion Star Com computer software, HyperTerminal or similar program and send remote commands from the computer to the meter.

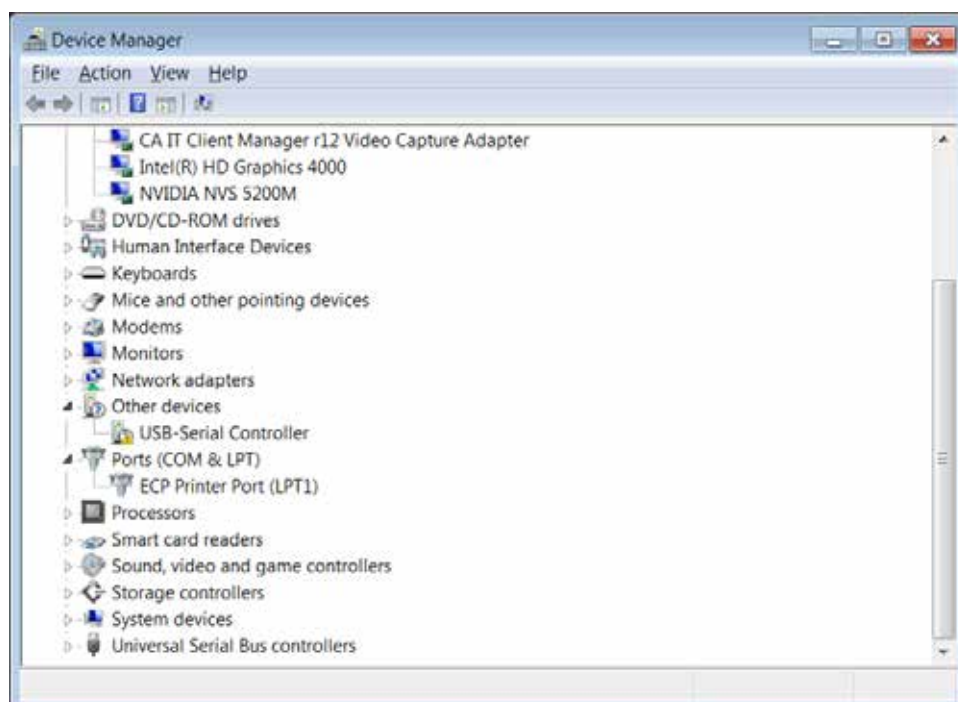


4. Record the COM port location of the USB-to-Serial cable, for example COM8. To view the COM port location, open the computer's Device Manager tool and expand the Ports option.
 - a. For Windows 7: Click the Start button and then click Control Panel. In the Control Panel window, click Device Manager if viewing by large icons or small icons or click System and Security and then click Device Manager if viewing by category. In the Device Manager window, expand the Ports option.
 - b. For Windows XP: Click the Start button and then click Control Panel. In the Control Panel window, click the Performance and Maintenance link and then click the System icon or for Control Panel Classic View, just double-click the System icon. In the System Properties window, click the Hardware tab and then click the Device Manager button. In the Device Manager window, expand the Ports option.



5. The meter is now able to transfer data to the computer using the Virtual COM port and Orion Star Com computer software, HyperTerminal or similar program.

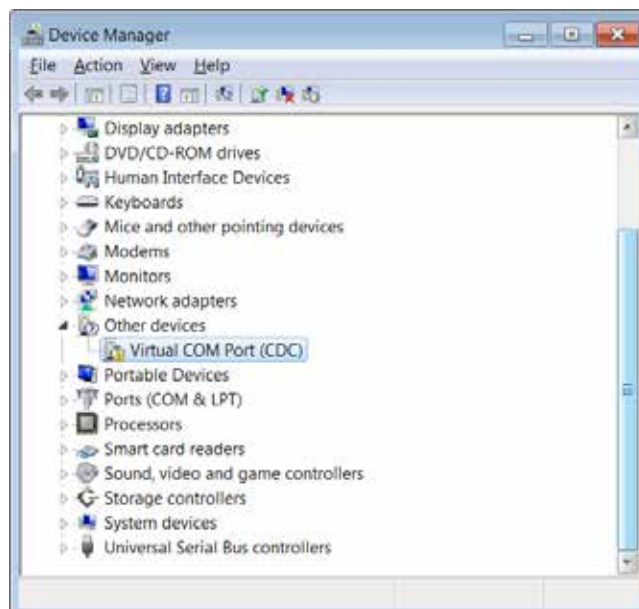
Note: If the computer does not automatically install the device driver, open the computer's Device Manager tool, expand the Other Devices option, double click the device and manually install the driver. The drivers for some RS232 to USB to adapters may need to be downloaded from the manufacturer's website. For example, when using a Tripp Lite adapter, go to <http://www.tripplite.com/support/downloads/>, enter the model number of the adapter (i.e. U209-000-R) and select the appropriate driver for the computer operating system.



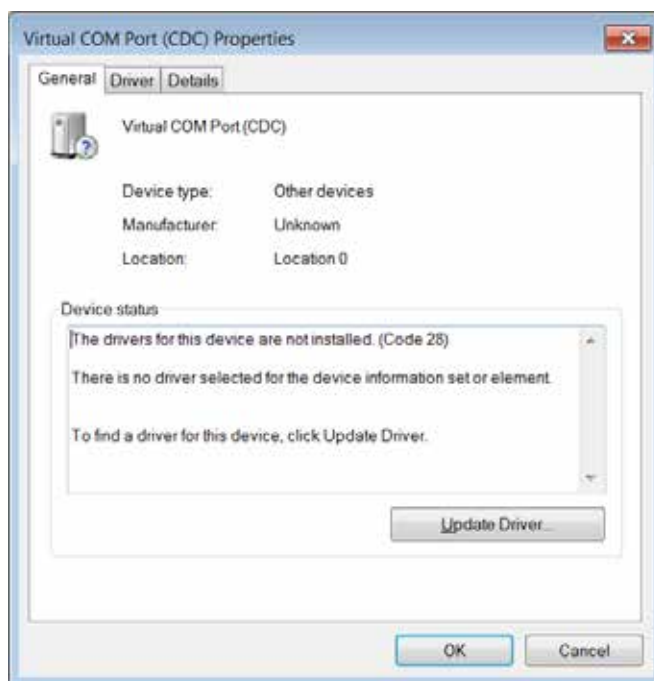
Using the USB Computer Cable

The Orion Star A200-A300 USB driver must be installed when the meter will be interfaced with a computer using the USB computer cable. The Orion Star A200-A300 USB driver is compatible with Microsoft® Windows® XP, Windows Vista®, Windows 7 and Windows 8 operating systems. When using a USB computer cable, always turn on the power to the meter and connect the USB computer cable first to the meter and then to the computer.

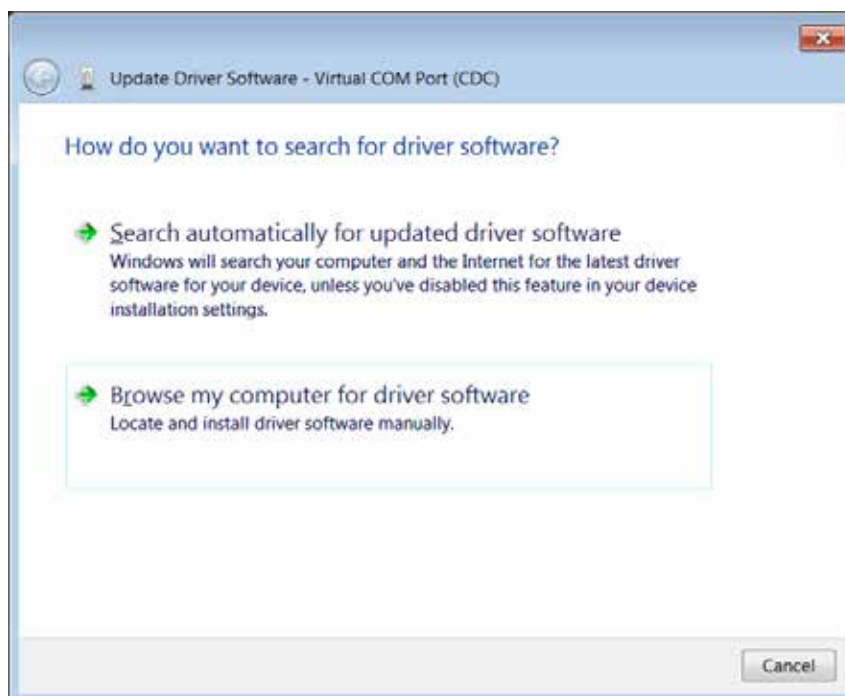
1. Go to www.thermoscientific.com/OrionMeters, download the Orion Star A200-A300 USB driver folder and unzip/extract the files to the computer's desktop.
2. Connect the power adapter to the meter and power on the meter.
3. Connect the USB cable first to the Mini B USB input on the meter and then to the USB input on a computer.
4. Once the USB cable is connected to the computer, the computer will try to search for the device driver software and then a message will appear that the device driver software was not successfully installed. Open the computer's Device Manager tool.
 - a. For Windows 7: Click the Start button and then click Control Panel. In the Control Panel window, click Device Manager if viewing by large icons or small icons or click System and Security and then click Device Manager if viewing by category. In the Device Manager window, expand the Ports option.
 - b. For Windows XP: Click the Start button and then click Control Panel. In the Control Panel window, click the Performance and Maintenance link and then click the System icon or for Control Panel Classic View, just double-click the System icon. In the System Properties window, click the Hardware tab and then click the Device Manager button. In the Device Manager window, expand the Ports option.
5. Locate and double-click on the Virtual COM Port (CDC) device in the Device Manager tool.



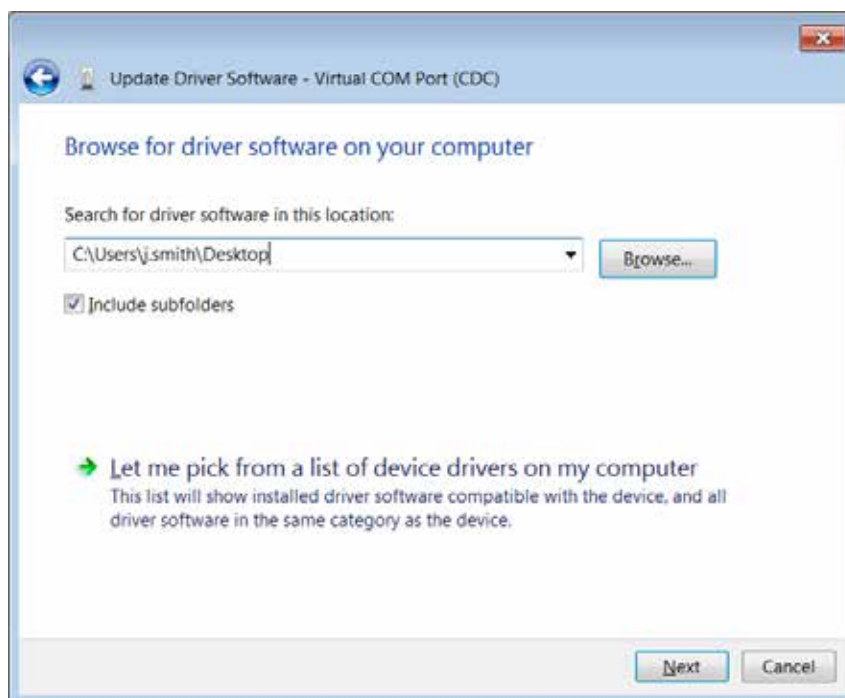
6. The Virtual COM Port (CDC) properties window will open. Click the Update Driver button.



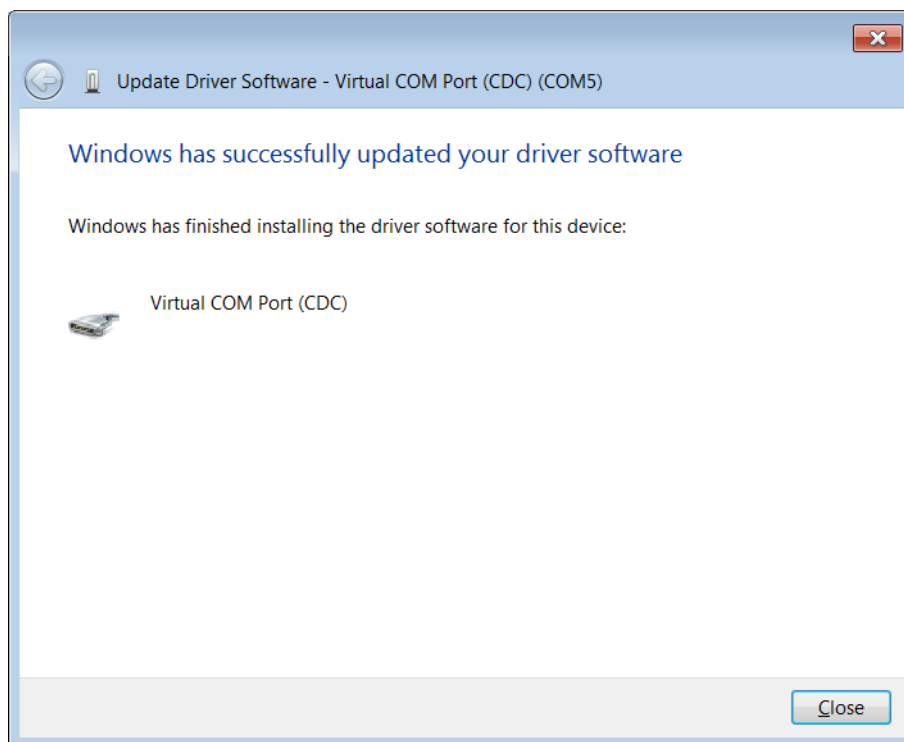
7. Click the "Browse my computer for driver software" option.



8. Click the Browse button, set the computer desktop as the location and click the Next button.



9. Wait while the driver software is installed and accept any warning messages.
10. Once the installation is complete, record the COM port location and click the Close button.

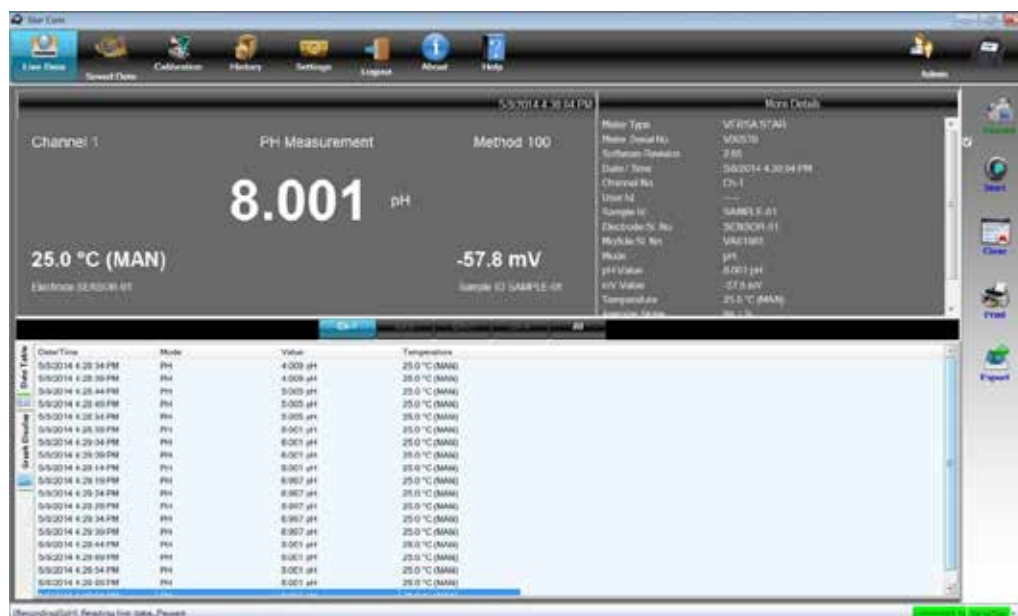


11. The meter is now able to transfer data to the computer using the Virtual COM port and Orion Star Com computer software, HyperTerminal or similar program.

Orion Star Com Communication Software

The Orion Star Com communication software is compatible with Orion Star A210 series benchtop meters and a free download is available at www.thermoscientific.com/OrionMeters. The Star Com software facilitates the transfer of calibration and measurement data from the meter to a computer and then allows data to be exported to an Excel (.xls) or Comma-Separated Values (.csv) file. Transferred data can also be printed from the computer.

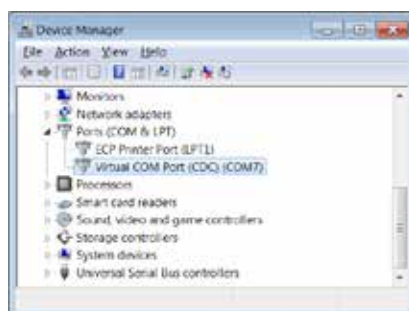
Orion Star A210 series benchtop meters must have software revision 2.59 or higher to use the Star Com software. The Orion Star A200/A300 series USB driver software must be installed on the computer if the USB port will be used to connect the meter with a computer.



Meter Interfacing with Other Computer Programs

If using the meter USB port to connect with the computer, the Orion Star A200/A300 series USB driver software (virtual COM port) must be installed on the computer and the meter should be updated to software revision 3.04 or higher.

1. Power on the meter and connect the meter to the computer using the appropriate computer interface cable.
2. Open a computer communication program that uses COM ports. Programs such as Terminal and HyperTerminal apply.
3. Select the correct Virtual COM Port and connect. The following examples are from HyperTerminal:



4. Verify that the meter export data setting is on. Match the baud rate set in the meter to the computer setting. Selecting a higher baud rate will allow for faster data transfer.
5. Data will transfer from the meter to the computer, depending on the meter read type and command settings.

Note: If the meter is powered off for any reason (auto-shut off, loss of power, etc.) the connection will need to be reestablished by repeating the steps above.

Star A200-A300 Meter Remote Control Protocols

Rules for Remote Control Usage

1. CR (Carriage Return, ASCII 13) is used to terminate a command. Whenever this character is received, the internal buffer will be processed.
2. All characters except for NL (New Line, ASCII 10) are significant. The NL character will be ignored. The meter is not case sensitive, though all lower case characters are converted to upper case internally.
3. Only one command can be executed at a time. No new command can issued until the current command is finished being processed. When the current command is finished, it will issue the ">" prompt to the user, indicating a new command can be entered.
4. Empty commands (i.e. just a CR) will be ignored and a new prompt will be issued.
5. Turn on the Export Data and Data Log meter settings. The default meter communication settings are:

Bits per second:	9600
Data bits:	8
Parity:	None
Stop bits:	1
Flow control:	None

Remote Control Engine

The remote control engine receives input from the serial/USB port and processes it as needed. Commands sent to the remote control interface will be in the form of "OPCODE <OPERAND(s)> C_R ". Line feeds will be ignored. New commands cannot be issued until the previous command has been completed and a prompt is given. A prompt is shown as the greater than symbol (">") followed by a space.

Star A200-A300 Meter Remote Control Commands

Press the **Esc** key on the computer keypad to stop a command being executed.

Command	Command Details												
GETMEAS	GETMEAS <CR> Prints the current channel measurement immediately. GETMEAS <u>Data Count</u> <CR> Prints the current channel measurement for a set number of times. Example: GETMEAS 2 GETMEASTIMED CH_Channel Combination, Time Interval <CR> Set the channel(s) to be measured and the time interval for the measurement, measurements are sent to the meter data log Channel Combination: Channel numbers to be measured. Time Interval: The measurement retrieving time interval in seconds. Example: GETMEASTIMED CH_12 5 <CR> STOP <CR> Command exits Timed measurement.												
GETCAL	GETCAL MODE <CR> Prints all the channel mode calibration data. If no calibration is available, will return ">" to receive next command. Example: GETCAL MODE <CR> GETCAL <u>MODE</u> <CR> Print calibration data for specific <u>MODE</u> as: <table><tr><td>PH</td><td>COND</td><td>DO</td></tr><tr><td>RMV</td><td>RES</td><td>RDO</td></tr><tr><td>ORP</td><td>SALT</td><td></td></tr><tr><td>ISE</td><td>TDS</td><td></td></tr></table> Example: GETCAL PH <CR>	PH	COND	DO	RMV	RES	RDO	ORP	SALT		ISE	TDS	
PH	COND	DO											
RMV	RES	RDO											
ORP	SALT												
ISE	TDS												
GETLOG	GETLOG <CR> Prints all the logged measurement data. If no data is logged, will return ">" to receive next command. Example: GETLOG <CR> GETLOG START, END <CR> Prints the data in a specified range. If no data is available, will return ">" to receive next command. Example: GETLOG 10 100 <CR>												
SYSTEM	SYSTEM <CR> Prints the Meter Model, Serial Number, Software Version Example: 329, 12345, 2.53												
SETRTC	SETRTC <u>YY MM DD HH MM SS</u> <CR> Set the date and time (in 24 hour format) for the meter Example: SETRTC 13 07 15 08 30 00												

Command	Command Details
SETMODE	SETMODE <u>MODE</u> <CR> Set the current channel measurement <u>MODE</u> as: PH COND DOSAT RMV RES DOCON ORP SALT ISE TDS Example: SETMODE PH <CR>
GETMODE	GETMODE <u>CHANNEL</u> <CR> Print the channel measurement mode Example: GETMODE 1
SETCSV	SETCSV <CR> Set printing format to CSV
SETKEYLOCK	SETKEYLOCK <u>NUMBER</u> <CR> To disable the key pad: Number = 0 To enable the key pad Number = 1

Meter Measurement Data from GETMEAS Command

Measure Mode	PC (CSV) Format
pH	Meter Model, Serial Number, Software Revision, User ID, Date & Time, Sample ID, Channel, Mode, pH Value, pH Unit, mV Value, mV Unit, Temperature Value, Temperature Unit, Slope Value, Slope Unit, Method #, Log # Example: A211 pH, X01036, 3.04, ABCDE, 01/03/15 16:05:41, SAMPLE, CH-1, pH, 7.000, pH, 0.0, mV, 25.0, C, 98.1,%, M100, #1 <CR>
mV	Meter Model, Serial Number, Software Revision, User ID, Date & Time, Sample ID, Channel, Mode, mV Value, mV Unit, Temperature Value, Temperature Unit, Method #, Log # Example: A211 pH, X01036, 3.04, ABCDE, 01/03/15 16:05:41, SAMPLE, CH-1, mV, 0.0, mV, 25.0, C, M100, #2 <CR>
RmV	Meter Model, Serial Number, Software Revision, User ID, Date & Time, Sample ID, Channel, Mode, Relative mV Value, Relative mV Unit, Offset mV Value, Offset mV Unit, Temperature Value, Temperature Unit, Method #, Log # Example: A211 pH, X01036, 3.04, ABCDE, 01/03/15 16:05:41, SAMPLE, CH-1, RmV, 0.0, RmV, 0.0, mV, 25.0, C, M100, #3 <CR>
ORP	Meter Model, Serial Number, Software Revision, User ID, Date & Time, Sample ID, Channel, Mode, ORP Value, ORP Unit, mV Value, mV Unit, Temperature Value, Temperature Unit, Method #, Log # Example: A211 pH, X01036, 3.04, ABCDE, 01/03/15 16:05:41, SAMPLE, CH-1, ORP, 0.0, mV, 0.0, mV, 25.0, C, M100, #4 <CR>

Measure Mode	PC (CSV) Format
ISE	Meter Model, Serial Number, Software Revision, User ID, Date & Time, Sample ID, Channel, Mode, ISE Value, ISE Unit, mV Value, mV Unit, Temperature Value, Temperature Unit, Slope Value, Slope Unit, Method #, Log # Example: A214 pH/ISE, X01037, 3.04, ABCDE, 01/03/15 16:05:41, SAMPLE, CH-1, ISE, 1, ppb, 0.0, mV, 25.0, C, 59.2, mV/dec, M100, #1 <CR>
Conductivity	Meter Model, Serial Number, Software Revision, User ID, Date & Time, Sample ID, Channel, Mode, Conductivity Value, Conductivity Unit, Conductance Value, Conductance Unit, Temperature Value, Temperature Unit, Temperature Coefficient Value, Temperature Coefficient Unit, Reference Temperature Value, Reference Temperature Unit, Cell Constant Value, Cell Constant Unit, Method #, Log # Example: A212 Cond, X01038, 3.04, ABCDE, 01/03/15 16:05:41, SAMPLE, CH-1, COND, 936.41, uS/cm, 1977.59, uS, 25.0, C, 2.1, %/C, 25.0, C, 0.4750, /cm, M100, #1 <CR>
TDS	Meter Model, Serial Number, Software Revision, User ID, Date & Time, Sample ID, Channel, Mode, TDS Value, TDS Unit, Conductance Value, Conductance Unit, Temperature Value, Temperature Unit, Temperature Coefficient Value, Temperature Coefficient Unit, Reference Temperature Value, Reference Temperature Unit, Cell Constant Value, Cell Constant Unit, Method #, Log # Example: A212 Cond, X01038, 3.04, ABCDE, 01/03/15 16:05:41, SAMPLE, CH-1, TDS, 460, ppm, 1975, uS, 25.0, C, 2.1, %/C, 25.0, C, 0.4750, /cm, M100, #2 <CR>
Salinity	Meter Model, Serial Number, Software Revision, User ID, Date & Time, Sample ID, Channel, Mode, Salinity Value, Salinity Unit, Conductance Value, Conductance Unit, Temperature Value, Temperature Unit, Salinity Type, Reference Temperature Value, Reference Temperature Unit, Cell Constant Value, Cell Constant Unit, Method #, Log # Example: A212 Cond, X01038, 3.04, ABCDE, 01/03/15 16:05:41, SAMPLE, CH-1, SALT, 0.5112, psu, 1973.120, uS, 25.0, C, Practical Salinity, 15.0, C, 0.4750, /cm, M100, #3 <CR>
Resistivity	Meter Model, Serial Number, Software Revision, User ID, Date & Time, Sample ID, Channel, Mode, Resistivity Value, Resistivity Unit, Conductance Value, Conductance Unit, Temperature Value, Temperature Unit, Temperature Coefficient Value, Temperature Coefficient Unit, Reference Temperature Value, Reference Temperature Unit, Cell Constant Value, Cell Constant Unit, Method #, Log # Example: A212 Cond, X01038, 3.04, ABCDE, 01/03/15 16:05:41, SAMPLE, CH-1, RES, 1068, Ohm-cm, 1982, uS, 25.0, C, 2.1, %/C, 25.0, C, 0.4750, /cm, M100, #4 <CR>
DO % Saturation	Meter Model, Serial Number, Software Revision, User ID, Date & Time, Sample ID, Channel, Mode, Percent Saturation Value, Percent Saturation Unit, Concentration Value, Concentration Unit, Current Value, Current Unit, Solution Temperature Value, Solution Temperature Unit, Membrane Temperature Value, Membrane Temperature Unit, Barometric Pressure Value, Barometric Pressure Unit, Salinity Correction Value, Salinity Correction Unit, Slope Value, Slope Unit, Method #, Log # Example: A213 DO/RDO, X01039, 3.04, ABCDE, 01/03/15 16:05:41, SAMPLE, CH-1, DO, 0.3, % Sat, 0.03, mg/L, 3.4, nA, 24.5, C, 24.6, C, 761.0, mmHg, 0.0, ppt, 11.800, Na/%Sat, M100, #1 <CR>

Measure Mode	PC (CSV) Format
DO mg/L	Meter Model, Serial Number, Software Revision, User ID, Date & Time, Sample ID, Channel, Mode, Concentration Value, Concentration Unit, Percent Saturation Value, Percent Saturation Unit, Current Value, Current Unit, Solution Temperature Value, Solution Temperature Unit, Membrane Temperature Value, Membrane Temperature Unit, Barometric Pressure Value, Barometric Pressure Unit, Salinity Correction Value, Salinity Correction Unit, Slope Value, Slope Unit, Method #, Log # Example: A213 DO/RDO, X01039, 3.04, ABCDE, 01/03/15 16:05:41, SAMPLE, CH-1, DO, 0.03, mg/L, 0.3,% sat, 3.4, nA, 24.5, C, 24.6, C, 761.0, mmHg, 0.0, ppt, 11.800, Na/%Sat, M100, #2 <CR>
RDO % Saturation	Meter Model, Serial Number, Software Revision, User ID, Date & Time, Sample ID, Channel, Mode, Percent Saturation Value, Percent Saturation Unit, Concentration Value, Concentration Unit, Partial Pressure Value, Partial Pressure Unit, Solution Temperature Value, Solution Temperature Unit, Barometric Pressure Value, Barometric Pressure Unit, Salinity Correction Value, Salinity Correction Unit, Slope Value, Slope Unit, Method #, Log # Example: A213 DO/RDO, X01039, 3.04, ABCDE, 01/03/15 16:05:41, SAMPLE, CH-1, RDO, 100.0,% Sat, 8.40, mg/L, 138.5, Torr, 24.0, C, 761.0, mmHg, 0.0, ppt, 1.383, Torr/%Sat, M100, #3 <CR>
RDO mg/L	Meter Model, Serial Number, Software Revision, User ID, Date & Time, Sample ID, Channel, Mode, Concentration Value, Concentration Unit, Percent Saturation Value, Percent Saturation Unit, Partial Pressure Value, Partial Pressure Unit, Solution Temperature Value, Solution Temperature Unit, Barometric Pressure Value, Barometric Pressure Unit, Salinity Correction Value, Salinity Correction Unit, Slope Value, Slope Unit, Method #, Log # Example: A213 DO/RDO, X01039, 3.04, ABCDE, 01/03/15 16:05:41, SAMPLE, CH-1, RDO, 8.40, mg/L, 100.0,% sat, 138.5, Torr, 24.0, C, 761.0, mmHg, 0.0, ppt, 1.383, Torr/%Sat, M100, #4 <CR>
Multi Channel	Meter Model, Serial Number, Software Revision, User ID, Date & Time, Sample ID, (followed by measurement data for each channel, as shown above) Example: A215 pH/Cond, X01040, 3.04, ABCDE, 01/03/15 16:05:41, SAMPLE, CH-1, pH, 7.000, pH, 0.0, mV, 25.0, C, 98.1,%, M100, CH-2, COND, 936.41, uS/cm, 1977.59, uS, 25.0, C, 2.1,%/C, 25.0, C, 0.4750, /cm, M200, #1 <CR>

Meter Calibration Data from GETCAL Command

Cal Mode	PC (CSV) Format
pH	Meter Model, Serial Number, Software Revision, Channel, Mode, Calibration Date & Time, Total Calibration Points, repeated for each calibration point: Calibration Point, pH Value, pH Unit, mV Value, mV Unit, Temperature Value, Temperature Unit, repeated for each point-to-point segment: Slope Value, Slope Unit, repeated for each point-to-point segment: Offset Value, Offset Unit, Average Slope Value, Average Slope Unit, Calibration Number Example (5 point calibration): A211 pH, X01036, 3.04, CH-1, pH, 01/03/15 16:05:41, 5, 1, 2.00, pH, 290.5, mV, 25.0, C, 2, 4.01, pH, 174.3, mV, 25.0, C, 3, 7.00, pH, 0.0, mV, 25.0, C, 4, 10.01, pH, -173.9, mV, 25.0, C, 5, 12.00, pH, -289.7, mV, 25.0, C, 97.7, %, 98.5, %, 97.7, %, 98.4, %, 1.4, mV, 0.0, mV, 0.0, mV, 1.3, mV, 98.1, %, #1 <CR>
RmV	Meter Model, Serial Number, Software Revision, Channel, Mode, Calibration Date & Time, Raw mV Value, Raw mV Unit, Relative mV Offset Value, Relative mV Offset Unit, Reference mV Value, Reference mV Unit, Calibration Number Example: A211 pH, X01036, 3.04, CH-1, RmV, 01/03/15 16:05:41, 0.0, mV, 0.0, mV, 0.0, mV, #1 <CR>
ORP	Meter Model, Serial Number, Software Revision, Channel, Mode, Calibration Date & Time, Raw mV Value, Raw mV Unit, Offset Value, Offset Unit, Temperature Value, Temperature Unit, Calibration Number Example: A211 pH, X01036, 3.04, CH-1, ORP, 01/03/15 16:05:41, 176.9, mV, 242.6, mV, 25.0, C, #1 <CR>
ISE	Meter Model, Serial Number, Software Revision, Channel, Mode, Calibration Date & Time, Total Calibration Points, repeated for each calibration point: Calibration Point, Concentration Value, Concentration Unit, mV Value, mV Unit, Temperature Value, Temperature Unit, repeated for each point-to-point segment: Slope Value, Slope Unit, repeated for each point-to-point segment: Offset Value, Offset Unit, Average Slope Value, Average Slope Unit, Blank Value, Blank Unit, Calibration Number Example (5 point calibration): A214 pH/ISE, X01036, 3.04, CH-1, ISE, 01/03/15 16:05:41, 5, 1, -1, ppb, 0.0, mV, 25.0, C, 2, 2, ppb, 19.0, mV, 25.0, C, 3, 300, ppb, 150.1, mV, 25.0, C, 4, -2000, ppb, 200.1, mV, 25.0, C, 5, 4000, ppb, 210.1, mV, 25.0, C, 63.1, mV/dec, 60.2, mV/dec, 60.7, mV/dec, 33.2, mV/dec, 0.0, mV, 0.9mV, 0.0mV, -0.2mV, 90.4, mV, 54.3, mV/dec, 0.0000, ppb, #1 <CR>
Conductivity	Meter Model, Serial Number, Software Revision, Channel, Mode, Calibration Date & Time, Total Calibration Points, repeated for each calibration point: Calibration Point, Conductivity Value, Conductivity Unit, Conductance Value, Conductance Unit, Temperature Value, Temperature Unit (MTC/ATC), Calibration Type, Calibration Factor, Average Cell Constant (K), Calibration Number Example (5 point calibration): A212 Cond, X01038, 3.04, CH-1, Cond, 01/03/15 16:05:41, 5, 1, 52.8, uS/cm, 111.1, uS, 25.0, C, Manual, 0.4750, 2, 68.6, uS/cm, 143.1, uS, 25.0, C, Manual, 0.4956, 3, 100, uS/cm, 200.2, uS, 25.0, C, Manual, 0.5511, 4, 158.4, uS/cm, 333.4, uS, 25.0, C, Manual, 0.4375, 5, 475, uS/cm, 1000, uS, 25.0, C, Manual, 0.4749, 0.4868 #1 <CR>

Cal Mode	PC (CSV) Format
DO (Air or Water Calibration)	Meter Model, Serial Number, Software Revision, Channel, Mode, Calibration Date & Time, Calibration Point, Calibration Type, Calibration Saturation Value, Calibration Saturation Unit, Set Zero Calibration Current Value, Set Zero Calibration Current Unit, Calibration Current Value, Calibration Current Unit, Solution Temperature Value, Solution Temperature Unit, Membrane Temperature Value, Membrane Temperature Unit, Calibration Pressure Value, Calibration Pressure Unit, Salinity Value, Salinity Unit, Calibration Slope Value, Calibration Slope Unit, Calibration Point, Calibration Number Example: A213 DO/RDO, X01039, 3.04, CH-1, DO, 01/03/15 16:05:41, 1, Auto- Air, 102.3, %, 0.0, nA, 405.1, nA, 5.0, C, 5.0, C, 736.1, mmHg, 0.0, ppt, 4.1, nA/%sat, 1, #1 <CR>
DO (Manual Calibration)	Meter Model, Serial Number, Software Revision, Channel, Mode, Calibration Date & Time, Calibration Point, Calibration Type, Calibration Concentration Value, Calibration Concentration Unit, Set Zero Calibration Current Value, Set Zero Calibration Current Unit, Calibration Current Value, Calibration Current Unit, Solution Temperature Value, Solution Temperature Unit, Membrane Temperature Value, Membrane Temperature Unit, Calibration Pressure Value, Calibration Pressure Unit, Salinity Value, Salinity Unit, Calibration Slope Value, Calibration Slope Unit, Calibration Point, Calibration Number Example: A213 DO/RDO, X01039, 3.04, CH-1, DO, 01/03/15 16:05:41, 1, Manual, 12.62, mg/l, 0.0, nA, 405.1, nA, 5.0, C, 5.0, C, 736.1, mmHg, 0.0, ppt, 4.1, nA/%sat, 1, #2 <CR>
RDO (Air or Water Calibration)	Meter Model, Serial Number, Software Revision, Channel, Mode, Calibration Date & Time, Probe Serial Number, Calibration Point, Calibration Type, Calibration Saturation Value, Calibration Saturation Unit, Set Zero Partial Pressure Value, Set Zero Partial Pressure Unit, Calibration Partial Pressure Value, Calibration Partial Pressure Unit, Solution Temperature Value, Solution Temperature Unit, Barometric Pressure Value, Barometric Pressure Unit, Salinity Value, Salinity Unit, Calibration Slope Value, Calibration Slope Unit, Calibration Point, Calibration Number Example: A213 DO/RDO, X01039, 3.04, CH-1, RDO, 01/03/15 16:05:41, 123454, 1, Auto-Air, 100.0, %, 8.2, Torr, 149.6, Torr, 24.3, C(ATC), 749.7, mmHg, 0.1, ppt, 1.52, Torr/%sat, 1, #1 <CR>
RDO (Manual Calibration)	Meter Model, Serial Number, Software Revision, Channel, Mode, Calibration Date & Time, Probe Serial Number, Calibration Point, Calibration Type, Calibration Concentration Value, Calibration Concentration Unit, Set Zero Partial Pressure Value, Set Zero Partial Pressure Unit, Calibration Partial Pressure Value, Calibration Partial Pressure Unit, Solution Temperature Value, Solution Temperature Unit, Barometric Pressure Value, Barometric Pressure Unit, Salinity Value, Salinity Unit, Calibration Slope Value, Calibration Slope Unit, Calibration Point, Calibration Number Example: A213 DO/RDO, X01039, 3.04, CH-1, RDO, 12/16/12, 09:21:00, 123454, 1, Manual, 6.9, mg/l, 8.2, Torr, 149.6, Torr, 24.3, C(ATC), 749.7, mmHg, 0.1, ppt, 1.52, Torr/%sat, 1, #1 <CR>

Meter Software Upgrade Procedure

The software upgrade program for Orion Star A200 series and Orion A300 series meters has been tested with Microsoft Windows 7, XP and Vista operating systems only. We are always working to update our programs; however, the software update program has not been tested with any other operating systems at this time.

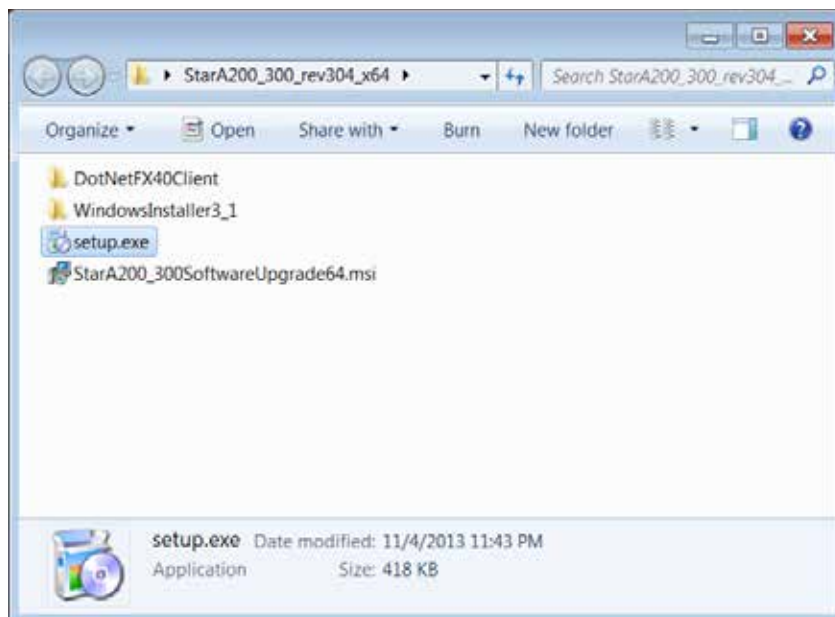
All computer screen savers and power management settings should be disabled when the meter is interfaced with the computer. The computer must not go into sleep/standby mode while the software update is performed. Many laptop computers go into sleep/standby mode when the lid is closed, so the lid should remain open throughout the software update. Laptop computers must also be plugged into a power supply when running the software update, performing the software update while the computer is on battery power is not recommended.

Note: Back up any stored meter data before upgrading the meter software.

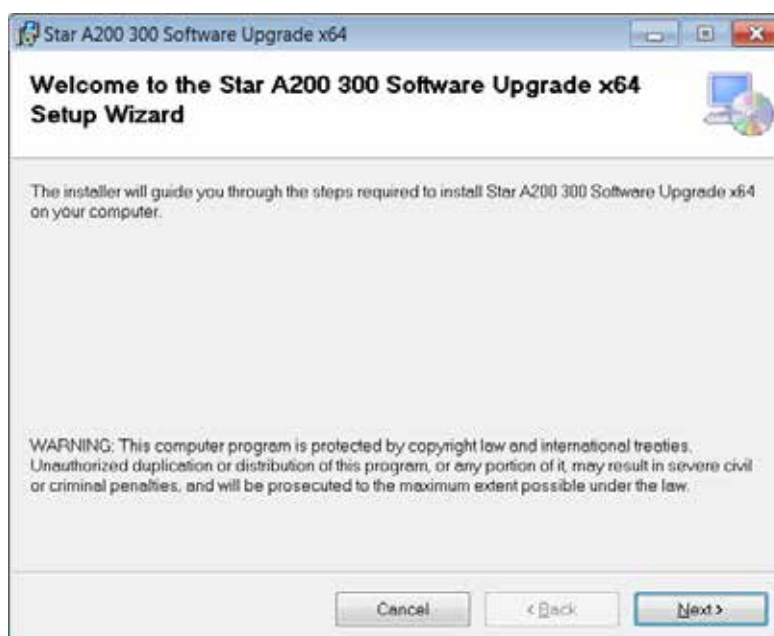
1. Go to www.thermoscientific.com/OrionMeters, download the latest software for Orion Star A200-A300 series meters and unzip/extract the software files to the computer's desktop.
 - a. There are two versions of the Orion Star A200-A300 series meter software update for Windows 32-bit operating systems and Windows 64-bit operating systems. To determine which to use with your computer:
 - i. For Windows 7: Click the Start button and then click Control Panel. In the Control Panel window, click System if viewing by large icons or small icons or click System and Security and then click System if viewing by category. In the System window, next to System Type, either 32-bit or 64-bit will be shown.
 - ii. For Windows XP: Click the Start button and then click Control Panel. In the Control Panel window, click the Performance and Maintenance link and then click the System icon or for Control Panel Classic View, just double-click the System icon. In the System Properties window, click the General tab and under System, if "x64 Edition" is shown, use the 64-bit version and if "x64 Edition" isn't shown, use the 32-bit version.
2. Uninstall any previous versions of the Orion Star A200-A300 series meter software update using the Computer's Programs and Features tool.



3. Make sure the computer interface cable is connected with the meter and computer and fully setup using the instructions in the [Using the USB-to-Serial Computer Cable](#) or [Using the USB Computer Cable](#) section.
4. Power on the meter. To ensure uninterrupted power through the update process, use the power adapter with benchtop meters and fully charged batteries or power adapter with portable meters.
5. Open the folder containing the unzipped/extracted software files and double click the setup.exe file to install the setup program onto the computer.



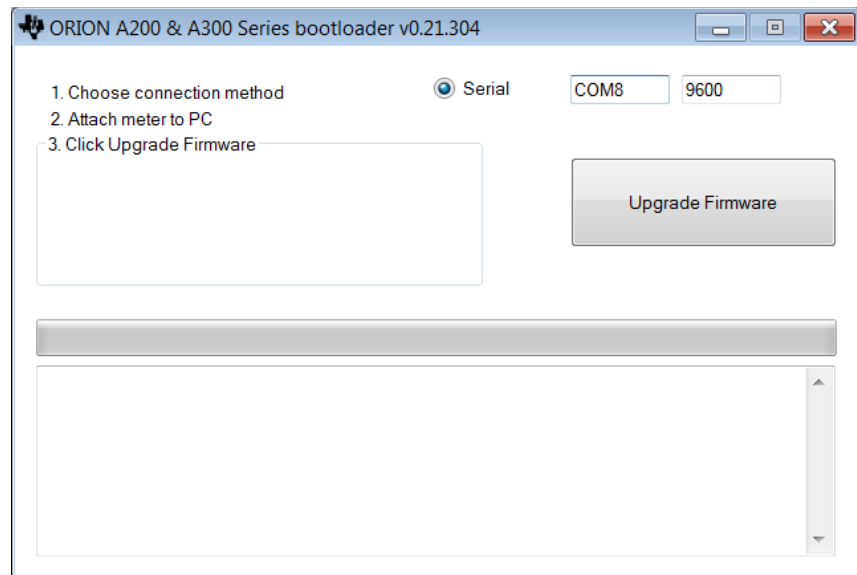
6. Follow all prompts to install the setup program onto the computer. If any security warning messages appear, select the run software option.



7. After successful installation of the setup program, a new StarA200_300SoftwareUpgrade icon will appear on the computer's desktop. Double click the icon to launch the program.



8. Follow all prompts, including reviewing and accepting the licensing agreement, to start the software update. If any security warning messages appear, select the run software option.
9. Set the interface parameters for running the software update program.
 - a. When using the USB-to-Serial computer cable, select Serial as the connection method, enter the COM port location (viewable in Device Manager under Ports) and enter the current meter baud rate (default setting is 9600).

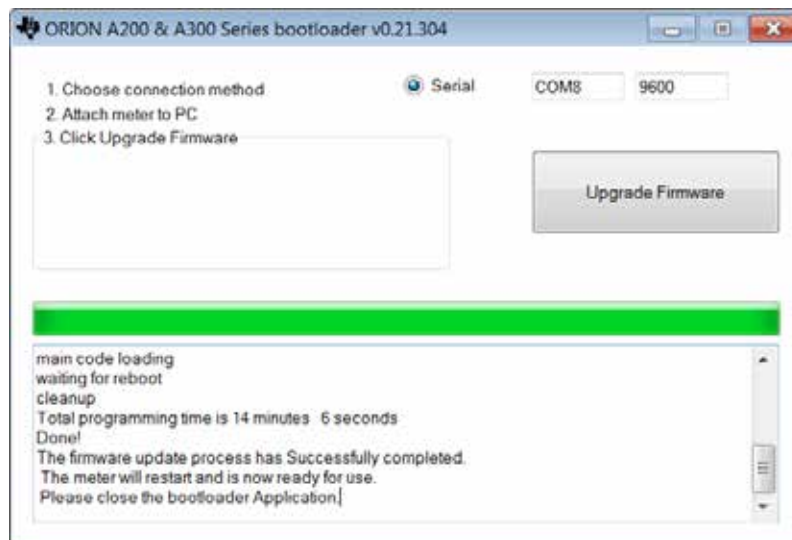


- b. When using the USB computer cable, the software update will detect the USB connection (USB driver must be installed prior to launching the software update).

10. Click the Upgrade Firmware button. Wait while the update is installed on the meter.
 - a. **Warning:** The software update must not be interrupted once the Update Firmware button is clicked. Interrupting the software update may corrupt the meter and cause it to not power on correctly.



11. The update will take approximately 15 minutes. Once the software update is complete, the dialog box will show "Done!"



12. Close the software update and detach the cable from the meter and computer.

Note: If the following message is shown and the USB cable is being used, turn the power to the meter off by unplugging the power adapter and/or remove batteries, disconnect the USB cable, close the software update and retry this procedure using the RS232 cable.



8

CHAPTER 8 Customer Services

For any questions or if you require assistance, contact our Technical Support Specialists:

- Email wai.techservbev@thermofisher.com
- Within the United States, call 1-800-225-1480
- Outside the United States, call +1-978-232-6000 or fax +1-978-232-6031

For additional product information, contact your local authorized dealer, local Thermo Scientific Orion technical sales representative or contact us using the Water and Laboratory Products (WLP) information on the page back of this manual.

Visit www.thermoscientific.com/water to view Thermo Scientific Orion products and download product literature, user guides and manuals, software updates, and additional application and technical resources.

For the most current warranty information, refer to the Thermo Scientific Orion warranty card included on the Thermo Scientific Orion Star A210 Series Meter literature CD and available online at www.thermoscientific.com/water.

Troubleshooting Tips

If an issue is encountered while using the Orion Star A210 Series meter, ensure the correct power adapter is being used and try power cycling the meter: disconnect the power adapter from the meter, wait 15 seconds and reconnect the power adapter to the meter.

Meter Issue	Recommended Action
The measurement value is flashing 9999 and displaying Over Range or Under Range	The measurement is outside the allowable measurement range. Verify that the correct channel is shown on the meter display. Make sure the electrode or sensor is fully connected with the meter.
The meter locks up while connected to a computer via the USB cable	Disconnect the USB cable from the meter and computer and then disconnect and reconnect the power adapter from the meter. Reestablish the meter and computer USB connection.
The meter keypad is unresponsive when using the Star Com computer software	The keypad lock option is enabled in the Star Com computer program. To disable the keypad lock: in the Star Com program click the Settings icon, uncheck the box next to Keypad Lock and press the Save icon.
The measurement value freezes and will not change	The read type is set to Auto-Read mode (AR icon shown on the display). Press the measure (esc) key to take a new measurement or use the setup menu to change the read type to continuous.
The meter display goes blank, shows random lines or intermittently freezes	Ensure the correct power supply for the Star A series meter is being used. This power supply is different from the one supplied with Thermo Scientific Orion Versa Star meters. The use of a surge protector or uninterrupted power supply (UPS) is also recommended. Perform a factor reset on the meter.
The meter does not automatically recognize the pH buffer during calibration	Verify the correct buffer set was selected in the setup menu. The meter uses raw mV readings to recognize the buffer. As the electrode ages or becomes dirty, its mV readings will drift. Check the buffers and clean the electrode according to the instructions in the electrode manual.
The meter does not recognize the conductivity standard during calibration	Verify that the correct nominal cell constant is entered in the setup menu for the conductivity sensor being calibrated. The cell constant is typically printed on the cable of the conductivity sensor. Verify that the conductivity standard is one that can be automatically recognized by the meter. Recalibrate the conductivity sensor using new conductivity standard.
The meter does not recognize an RDO optical or polarographic dissolved oxygen sensor	Make sure the dissolved oxygen sensor is fully connected with the meter and verify the correct channel is shown on the meter display. Wait about 15 seconds after connecting a dissolved oxygen sensor for the meter to recognize the DO sensor type. Press the measure (esc) key to initiate a new measurement and update the meter display.

Meter Factory Reset Procedure

Warning: Performing a factory reset will erase the meter's calibration log and data log and reset all meter setup parameters to the factory default settings.

1. In the measurement mode, press the **setup** key.
2. Press the **p**, **q**, **t** or **u** key to highlight Diagnostics and press the **f3 (select)** key.
3. Press the **p** or **q** key to highlight Factory Reset and press the **f2 (select)** key.
4. Press the **f2 (yes)** key to start the factory reset procedure.
5. Press the **f3 (edit)** key to access the popup number entry screen and enter the default meter password of 111111.
 - a. Press the **p**, **q**, **t** or **u** key to highlight the number 1 and press the **f3 (enter)** key six times until 111111 is shown at the top of the screen.
 - b. Press the **f2 (done)** key to save the value and exit the number entry screen.
6. Press the **f2 (accept)** key to initiate the factory reset.
7. Wait while the factory reset is performed. Once completed, the meter will go through a power cycle and then proceed to the measurement mode. All meter settings will be reset to the factory default settings and the calibration log and data log will be erased.

Meter User Reset Procedure

1. In the measurement mode, press the **setup** key.
2. Press the **p**, **q**, **t** or **u** key to highlight Diagnostics and press the **f3 (select)** key.
3. Press the **p** or **q** key to highlight User Reset and press the **f2 (select)** key.
4. Press the **f2 (yes)** key to initiate the user reset procedure.
5. Wait while the user reset is performed. Once completed, the meter will proceed to the measurement mode. All meter settings will be reset to the factory default settings; however the calibration log and data log will be retained.

Notice of Compliance

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

“This digital apparatus does not exceed the (Class A) limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.”

“Le present appareil numerique n’emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques (de la class A) prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.”

WEEE Compliance

This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. It is marked with the symbol shown here.



Further information on compliance with these directives, the recyclers in your country, and information on Thermo Scientific Orion products that may assist the detection of substances subject to the RoHS Directive are available by contact us using the Water and Laboratory Products (WLP) information on the back page of this manual.

Declaration of Conformity

Manufacturer: Thermo Fisher Scientific Inc
Address: Ayer Rajah Crescent
Blk 55 #04-16/24
Singapore 139949
Singapore

Hereby declares that the following products:

Thermo Scientific Orion Star A210 Series Benchtop Meters are rated 100 to 240 VAC,
50/60 Hz, 0.5A

Benchtop Meter Models:

Orion Star A211 pH Meter
Orion Star A212 Conductivity Meter
Orion Star A213 RDO/DO Meter
Orion Star A214 pH/ISE Meter
Orion Star A215 pH/Conductivity Meter
Orion Star A216 pH/RDO/DO Meter

Equipment Class:

Measurement, control and laboratory
Orion Star A-series meters are EMC Class A

Conforms with the following directives and standards:

EN61326-1:2013	Electromagnetic Compatibility (EMC Directive) Electrical equipment for measurement, control and laboratory use - EMC requirements
EN61010-1:2010	Safety Standards
UL61010-1:2012	Safety requirements for electrical equipment for measurement,
CAN/CSA C22.2 No. 61010-1:2012	control and laboratory use - general requirements.



Cheow Kwang Chan
QA/Regulatory Manager

Place and Date of Issue:
16 February 2015
Singapore

Meter Specifications



Orion Star A210 Series Benchtop Meter Operating Conditions	
Operating Ambient Temperature	5 to 45 °C
Operating Relative Humidity	5 to 85%, non-condensing
Storage Temperature	-20 to 60 °C
Storage Relative Humidity	5 to 85%, non-condensing
Pollution	Degree 2
Overvoltage	Category II
Meter Weight	0.9 kg (2 lb)
Meter Dimensions (H x W x D)	11 cm x 18 cm x 24 cm (4.33" x 7.09" x 9.45")
Regulatory and Safety	CE, TUV 3-1, FCC Class A
Power Rating	DC input: 9VDC, 1A
	Battery: 4 x AA
Shock and Vibration	Shock: drop test in packaging per ISTA #1A
	Vibration: shipping/handling per ISTA #1A
Enclosure (designed to meet)	IP54
Warranty	3 years

Universal Power Adapter Operating Conditions	
Operating Ambient Temperature	0 to 50 °C
Operating Relative Humidity	0 to 90%, non-condensing
Storage Temperature	-20 to 75 °C
Storage Relative Humidity	0 to 90%, non-condensing
Pollution	Degree 2
Overvoltage	Category II

Orion Star A210 Series Benchtop Meter Specifications	
Measurement Channels	1 to 2
Display	Graphic LCD
Measurement Modes	Auto-Read, Continuous, Timed
Data Log Memory	2000 data points with time and date stamp
Data Log Functions	Automatic logging with Auto-Read and Timed measure modes; manual logging with Continuous measure mode
Data Log Transfer	Transfer single, range or all data points to printer or computer
Data Log Editing	Delete all data points

Orion Star A210 Series Benchtop Meter Specifications	
Calibration Log	10 calibrations per channel with time and date stamp
Computer Software	Orion Star Com data transfer software available free on website
Methods	10 per channel with password protection
Alarms	Limit alarm, calibration alarm
Sample ID	Manual entry, auto-incremental or off
User ID	Manual entry or off
Communication Ports	RS232, USB
Stirrer Probe Ports	1
Power Source	Universal AC power adapter, 90-260 VAC, 50-60 Hz or optional 4 AA batteries (average 800 hours of battery life)
Multilanguage User Interface	English, Spanish, French, Italian, German and Chinese Portuguese and Korean available with software update on web

Orion Star A211 pH Benchtop Meter Specifications		
Measurement Channels		1 – pH, mV, relative mV (RmV) or ORP with temperature
pH	Range	- 2.000 to 20.000
	Resolution	0.1 / 0.01 / 0.001
	Relative Accuracy	±0.002
	Calibration Points	Up to 5
	Calibration Editing	Yes
	Input Impedance	> 10 ¹² ohms
	Electrode Status	Onscreen indicator for good, fair or bad electrode status
mV / RmV	Range	±2000.0 mV
	Resolution	0.1 mV
	Relative Accuracy	±0.2 mV or ±0.05% of reading, whichever is greater
	Relative mV Mode	Yes
	E _H ORP Mode	Yes
Temperature	Range	-5 to 105 °C, 22 to 221 °F
	Resolution	0.1 °C, 0.1 °F
	Relative Accuracy	±0.1 °C
	Offset Calibration	1 point
	Source Options	Manual or automatic with ATC probe
Sensor Inputs	BNC	pH or ORP electrode
	Pin Tip	Reference electrode
	8 pin MiniDIN	ATC temperature probe

Orion Star A212 Conductivity Benchtop Meter Specifications		
Measurement Channels		1 – conductivity, salinity, TDS or resistivity with temperature
Conductivity	Range	0.001 μ S to 3000 mS
	Resolution	0.001 μ S minimum, auto ranging, up to 4 significant digits
	Relative Accuracy	0.5% of reading ± 1 digit $> 3 \mu$ S, 0.5% of reading $\pm 0.01 \mu$ S $\leq 3 \mu$ S
	Reference Temperature	5 °C, 10 °C, 15 °C, 20 °C, 25 °C
	Temperature Compensation	Linear (0 to 10.0%/°C), nonlinear nLFn, nonlinear nLFu, EP (USP), off
	Cell Constants	0.001 to 199.9 cm^{-1}
	Calibration Points	Up to 5
	Calibration Editing	Yes
Salinity	Range	0.06 to 80.00 psu, 0.05 to 42.00 ppt
	Resolution	0.01 psu or 0.01 ppt minimum, auto ranging
	Relative Accuracy	0.5% of reading ± 1 digit
	Type	Practical salinity (psu) or natural sea water (ppt)
TDS	Range	0.001 to 200.0 ppm
	Resolution	0.001 ppm minimum, auto ranging, up to 4 significant digits
	Relative Accuracy	0.5% of reading ± 1 digit
	TDS Factor	Linear (0.02 to 9.99)
Resistivity	Range	2 Ω to 100 M Ω
	Resolution	1 Ω or 0.1 M Ω , auto ranging
	Relative Accuracy	0.5% of reading ± 1 digit
Temperature	Range	-5 to 105 °C, 22 to 221 °F
	Resolution	0.1 °C, 0.1 °F
	Relative Accuracy	± 0.1 °C
	Offset Calibration	1 point
	Source Options	Manual or automatic with built-in temperature sensor
Sensor Input	8 pin MiniDIN	Conductivity sensor with built-in temperature

Orion Star A213 RDO/DO Benchtop Meter Specifications			
Measurement Channels		1 – dissolved oxygen as % saturation or mg/L with temperature	
Dissolved Oxygen	Polarographic	Concentration	% Saturation
	Range	0 to 90 mg/L	0 to 600 %
	Resolution	0.01 / 0.1 mg/L	0.1 / 1 %
	Relative Accuracy	±0.2 mg/L or ±2% of reading, whichever is greater	±2 % saturation or ±2% of reading, whichever is greater
	RDO Optical	Concentration	% Saturation
	Range	0 to 50 mg/L	0 to 500 %
	Resolution	0.01 / 0.1 mg/L	0.1 / 1 %
	Relative Accuracy	±0.1 mg/L up to 8 mg/L, ±0.2 mg/L 8 to 20 mg/L, ±10% of reading up to 50 mg/L	±2 % saturation ≤ 200 % saturation, ±10 % saturation > 200 % saturation
Barometric Pressure Correction		400 to 850 mmHg, automatic using built-in barometer (±6 mmHg) or manual entry	
Salinity Correction Factor		0.0 to 45.0 ppt, automatic using manual entry of sample salinity	
Calibration Types		Water-saturated air, air-saturated water, manual (Winkler), zero point	
Compatible Sensors		Polarographic, RDO optical	
Temperature	Range	0 to 50 °C, 32 to 122 °F	
	Resolution	0.1 °C, 0.1 °F	
	Relative Accuracy	±0.1 °C	
	Offset Calibration	1 point	
	Source Options	Automatic with built-in temperature sensor	
Sensor Input	9 pin MiniDIN	Dissolved oxygen sensor with built-in temperature	

Orion Star A214 pH/ISE Benchtop Meter Specifications		
Measurement Channels		1 – pH, mV, RmV, ORP or ion concentration with temperature
pH	Range	- 2.000 to 20.000
	Resolution	0.1 / 0.01 / 0.001
	Relative Accuracy	±0.002
	Calibration Points	Up to 5
	Calibration Editing	Yes
	Input Impedance	> 10 ¹² ohms
	Electrode Status	Onscreen indicator for good, fair or bad electrode status
ISE (Ion Concentration)	Range	0.0001 to 19900
	Resolution	0.0001 minimum, 1 to 3 significant digits (user selectable)
	Relative Accuracy	±0.2 mV or ±0.05% of reading, whichever is greater
	Units	ppm, Molar, mg/L, %, ppb, none
	Calibration Points	Up to 5
	Calibration Editing	Yes
	Advanced Features	Segmented (point-to-point) slope, non-linear selectable auto-blank, low concentration range stability
mV / RmV	Range	±2000.0 mV
	Resolution	0.1 mV
	Relative Accuracy	±0.2 mV or ±0.05% of reading, whichever is greater
	Relative mV Mode	Yes
	E_H ORP Mode	Yes
Temperature	Range	-5 to 105 °C, 22 to 221 °F
	Resolution	0.1 °C, 0.1 °F
	Relative Accuracy	±0.1 °C
	Offset Calibration	1 point
	Source Options	Manual or automatic with ATC probe
Sensor Inputs	BNC	pH electrode, ORP electrode or ion selective electrode (ISE)
	Pin Tip	Reference electrode
	8 pin MiniDIN	ATC temperature probe

Orion Star A215 pH/Conductivity Benchtop Meter Specifications		
Measurement Channels		2 – Ch. 1: pH, mV, relative mV (RmV) or ORP with temperature Ch. 2: conductivity, salinity, TDS or resistivity with temperature
pH	Range	- 2.000 to 20.000
	Resolution	0.1 / 0.01 / 0.001
	Relative Accuracy	±0.002
	Calibration Points	Up to 5
	Calibration Editing	Yes
	Input Impedance	> 10 ¹² ohms
	Electrode Status	Onscreen indicator for good, fair or bad electrode status
mV / RmV	Range	±2000.0 mV
	Resolution	0.1 mV
	Relative Accuracy	±0.2 mV or ±0.05% of reading, whichever is greater
	Relative mV Mode	Yes
	E_H ORP Mode	Yes
Conductivity	Range	0.001 µS to 3000 mS
	Resolution	0.001 µS minimum, auto ranging, up to 4 significant digits
	Relative Accuracy	0.5% of reading ±1 digit > 3 µS, 0.5% of reading ±0.01 µS ≤ 3 µS
	Reference Temp.	5 °C, 10 °C, 15 °C, 20 °C, 25 °C
	Temp. Comp.	Linear, nonlinear nLFn, nonlinear nLFu, EP (USP), off
	Calibration Points	Up to 5 with calibration editing option
Salinity	Range	0.06 to 80.00 psu, 0.05 to 42.00 ppt
	Resolution	0.01 psu or 0.01 ppt minimum, auto ranging
	Relative Accuracy	0.5% of reading ±1 digit
	Type	Practical salinity (psu) or natural sea water (ppt)
TDS	Range	0.001 to 200.0 ppm
	Resolution	0.001 ppm minimum, auto ranging, up to 4 significant digits
	Relative Accuracy	0.5% of reading ±1 digit
	TDS Factor	Linear (0.02 to 9.99)
Resistivity	Range	2 Ω to 100 MΩ
	Resolution	1 Ω or 0.1 MΩ, auto ranging
	Relative Accuracy	0.5% of reading ±1 digit
Temperature	Range	-5 to 105 °C, 22 to 221 °F
	Resolution	0.1 °C, 0.1 °F
	Relative Accuracy	±0.1 °C
	Offset Calibration	1 point
	Source Options	Manual or automatic with ATC probe or built-in temp. sensor
Sensor Inputs	BNC	pH or ORP electrode
	Pin Tip	Reference electrode
	8 pin MiniDIN	Conductivity sensor with built-in temperature or ATC probe

Orion Star A216 pH/RDO/DO Benchtop Meter Specifications			
Measurement Channels		2 – Ch. 1: pH, mV, relative mV (RmV) or ORP with temperature Ch. 2: dissolved oxygen as% saturation or mg/L with temperature	
pH	Range	- 2.000 to 20.000	
	Resolution	0.1 / 0.01 / 0.001	
	Relative Accuracy	±0.002	
	Calibration Points	Up to 5	
	Calibration Editing	Yes	
	Input Impedance	> 10 ¹² ohms	
	Electrode Status	Onscreen indicator for good, fair or bad electrode status	
mV / RmV	Range	±2000.0 mV	
	Resolution	0.1 mV	
	Relative Accuracy	±0.2 mV or ±0.05% of reading, whichever is greater	
	Relative mV Mode	Yes	
	E_H ORP Mode	Yes	
Dissolved Oxygen	Polarographic	Concentration	% Saturation
	Range	0 to 90 mg/L	0 to 600 %
	Resolution	0.01 / 0.1 mg/L	0.1 / 1 %
	Relative Accuracy	±0.2 mg/L or ±2% of reading, whichever is greater	±2 % saturation or ±2% of reading, whichever is greater
	RDO Optical	Concentration	% Saturation
	Range	0 to 50 mg/L	0 to 500 %
	Resolution	0.01 / 0.1 mg/L	0.1 / 1 %
	Relative Accuracy	±0.1 mg/L up to 8 mg/L, ±0.2 mg/L 8 to 20 mg/L, ±10% of reading up to 50 mg/L	±2 % saturation ≤ 200 % saturation, ±10 % saturation > 200 % saturation
	Barometric Pressure Correction	400 to 850 mmHg, automatic using built-in barometer (±6 mmHg) or manual entry	
	Salinity Correction	0.0 to 45.0 ppt, automatic using manual entry of sample salinity	
	Calibration Types	Water-saturated air, air-saturated water, manual, zero point	
	Compatible Sensors	Polarographic, RDO optical	
	Source Options	Manual or automatic with ATC probe or built-in temp. sensor	
Temperature	Range	0 to 50 °C, 32 to 122 °F	
	Resolution	0.1 °C, 0.1 °F	
	Relative Accuracy	±0.1 °C	
	Offset Calibration	1 point	
	Source Options	Manual or automatic with ATC probe or built-in temp. sensor	
Sensor Inputs	BNC	pH or ORP electrode	
	Pin Tip	Reference electrode	
	8 pin MiniDIN	ATC temperature probe	
	9 pin MiniDIN	Dissolved oxygen sensor with built-in temperature	

Note: All specifications are subject to change without notice.

Ordering Information

Cat. No.	Description
STARA2110	Star A211 pH meter with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate
STARA2115	Star A211 pH meter kit with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate 8302BNUMD ROSS Ultra Triode refillable glass-body pH/ATC electrode 810199 ROSS pH buffer and storage solution kit
STARA2116	Star A211 pH meter kit with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate 8157BNUMD ROSS Ultra Triode refillable epoxy-body pH/ATC electrode 810199 ROSS pH buffer and storage solution kit
STARA2117	Star A211 pH meter kit with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate 9157BNMD Standard Triode refillable epoxy-body pH/ATC electrode 910199 pH buffer and storage solution kit
STARA2120	Star A212 conductivity meter with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate
STARA2125	Star A212 conductivity meter kit with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate 013005MD DuraProbe 4-cell (K=0.475) epoxy-body conductivity sensor 011007 Orion 1413 μS conductivity standard, 5 x 60 mL
STARA2126	Star A212 conductivity meter kit with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate 013016MD Pure water 2-cell (K=0.1) conductivity sensor with detachable flow cell 011008 Orion 100 μS conductivity standard, 5 x 60 mL
STARA2130	Star A213 RDO/DO meter with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate
STARA2135	Star A213 RDO/DO meter kit with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate 083005MD Polarographic DO sensor with calibration sleeve 080513 DO sensor maintenance kit - BOD adapter, funnel and stirrer
STARA2136	Star A213 RDO/DO meter kit with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate 086030MD Polarographic Auto-Stir BOD/DO sensor 080513 DO sensor maintenance kit 080514 DO sensor electrolyte solution
STARA2140	Star A214 pH/ISE meter with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate
STARA2145	Star A214 pH/ISE meter kit with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate 8102BNUWP ROSS Ultra refillable glass-body pH electrode 927007MD Orion stainless steel ATC temperature probe 096019 Orion Star stirrer probe 810199 ROSS pH buffer and storage solution kit

Cat. No.	Description
STARA2146	Star A214 pH/ISE meter kit with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate • 8102BNUWP ROSS Ultra refillable glass-body pH electrode • 9512HPBNWP Orion high-performance ammonia ion selective electrode (ISE) • 927007MD Orion stainless steel ATC temperature probe • 096019 Orion Star stirrer probe • 951007 Orion 1000 ppm ammonia standard, 475 mL • 951210 Orion low-level ammonia ISA solution, 475 mL • 951213 Orion ammonia electrode storage solution, 475 mL
STARA2147	Star A214 pH/ISE meter kit with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate • 8102BNUWP ROSS Ultra refillable glass-body pH electrode • 9609BNWP Orion fluoride ion selective electrode (ISE) • 927007MD Orion stainless steel ATC temperature probe • 096019 Orion Star stirrer probe • 040906 Orion 1 ppm with TISAB II fluoride standard, 475 mL • 040907 Orion 2 ppm with TISAB II fluoride standard, 475 mL • 040908 Orion 10 ppm with TISAB II fluoride standard, 475 mL • 940909 Orion TISAB II solution, 1 gallon
STARA2148	Star A214 pH/ISE meter kit with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate • 8102BNUWP ROSS Ultra refillable glass-body pH electrode • 8611BNWP ROSS sodium ion selective electrode (ISE) with standards and ISA • 927007MD Orion stainless steel ATC temperature probe • 096019 Orion Star stirrer probe
STARA2150	Star A215 pH/conductivity meter with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate
STARA2155	Star A215 pH/conductivity meter kit with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate • 8157BNUMD ROSS Ultra Triode refillable epoxy-body pH/ATC electrode • 013005MD DuraProbe 4-cell (K=0.475) epoxy-body conductivity sensor • 810199 ROSS pH buffer and storage solution kit • 011007 Orion 1413 μS conductivity standard, 5 x 60 mL
STARA2160	Star A216 pH/RDO/DO meter with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate
STARA2165	Star A216 pH/RDO/DO meter kit with electrode stand, universal power adapter, literature CD, printed quick start guide, computer interface cable and meter test certificate • 8157BNUMD ROSS Ultra Triode refillable epoxy-body pH/ATC electrode • 083005MD Polarographic DO sensor with calibration sleeve • 810199 ROSS pH buffer and storage solution kit • 080513 DO sensor maintenance kit • BOD adapter, funnel and stirrer

Meter Accessories, Electrodes and Solutions

Cat. No.	Description
IQQQ-STARA	Star A210, Star A220 and Star A320 series meter IQ/OQ (installation qualification / operation qualification) documentation, valid for all listed meter configurations
STARA-BEA	Star A and VERSA STAR benchtop meter-attachable electrode stand, includes electrode arm, holder and meter bracket
STARA-HB	Freestanding weighted base for use with Star A and VERSA STAR electrode stand
810017	Storage sleeve and base for 12mm diameter electrodes
1010003	Universal power adapter for Star A series meters
1010053	Star series RS232 computer cable
1010005	Star series RS232 to USB cable and adapter
1010006	Star series inkjet printer, 110V/220V, with RS232 printer cable
096019	Orion Star stirrer probe, pin tip connector
927007MD	Orion ATC temperature probe with stainless steel body, MiniDIN connector
927005MD	Orion ATC temperature probe with epoxy body, MiniDIN connector
928007MD	Orion micro ATC temperature probe with stainless steel tip, MiniDIN connector
8102BNUWP	ROSS Ultra glass-body refillable pH electrode, BNC connector
8156BNUWP	ROSS Ultra epoxy-body refillable pH electrode, BNC connector
8172BNWP	ROSS Sure-Flow glass-body refillable pH electrode, BNC connector
8165BNWP	ROSS Sure-Flow epoxy-body refillable pH electrode, BNC connector
8302BNUMD	ROSS Ultra Triode glass-body refillable pH/ATC electrode, BNC & MiniDIN connectors
8157BNUMD	ROSS Ultra Triode epoxy-body refillable pH/ATC electrode, BNC & MiniDIN connectors
8107BNUMD	ROSS Ultra Triode epoxy-body gel-filled pH/ATC electrode, BNC & MiniDIN connectors
8135BNUWP	ROSS Ultra epoxy-body refillable pH electrode with flat surface bulb, BNC connector
8163BNWP	ROSS spear tip glass-body refillable pH electrode, BNC connector
8103BNUWP	ROSS Ultra semi-micro glass-body refillable pH electrode, BNC connector
8115BNUWP	ROSS Ultra semi-micro epoxy-body refillable pH electrode, BNC connector
8220BNWP	ROSS micro glass-body refillable pH electrode, BNC connector
810199	ROSS All-in-One pH buffer and storage solution kit, includes pH 4, 7, 10 buffers; ROSS storage solution; pH electrode cleaning solution; pH electrode storage bottle
810001	ROSS pH electrode storage solution, 475 mL
910001	Standard pH electrode storage solution, 475 mL
910168	Orion pH 1.68 buffer, 475 mL
910104	Orion pH 4.01 buffer, 475 mL
910105	Orion pH 5.00 buffer, 475 mL
910686	Orion pH 6.86 buffer, 475 mL
910107	Orion pH 7.00 buffer, 475 mL
910918	Orion pH 9.18 buffer, 475 mL
910110	Orion pH 10.01 buffer, 475 mL
910112	Orion pH 12.46 buffer, 475 mL

Cat. No.	Description
9678BNWP	Orion Sure-Flow ORP epoxy-body refillable electrode, BNC connector
9180BNMD	Orion Triode ORP/ATC epoxy-body refillable electrode, BNC & MiniDIN connectors
967901	Orion ORP standard solution, 475 mL
967961	Orion ORP standard solution, 5 x 60 mL
9512HPBNWP	Orion high-performance ammonia ion selective electrode, BNC connector
9512BNWP	Orion standard ammonia ion selective electrode, BNC connector
951007	Orion 1000 ppm ammonia standard, 475 mL
951211	Orion ammonia ionic strength adjuster (ISA) with pH-indicating blue dye, 475 mL
951210	Orion low level ammonia ISA with pH-indicating blue dye, 475 mL
9609BNWP	Orion fluoride ion selective electrode, BNC connector
940907	Orion 100 ppm fluoride standard, 475 mL
940909	Orion TISAB II total ionic strength adjustment buffer for fluoride analysis, 3.8 L
040906	Orion 1 ppm fluoride standard premixed with TISAB II, 475 mL
040907	Orion 2 ppm fluoride standard premixed with TISAB II, 475 mL
040908	Orion 10 ppm fluoride standard premixed with TISAB II, 475 mL
9707BNWP	Orion nitrate ion selective electrode, BNC connector
920707	Orion 1000 ppm nitrate standard, 475 mL
930711	Orion nitrate ionic strength adjuster (ISA), 475 mL
930710	Orion nitrate interference suppressor solution, 475 mL
8611BNWP	ROSS sodium ion selective electrode, BNC connector
841108	Orion 1000 ppm sodium standard, 475 mL
841111	Orion sodium ionic strength adjuster (ISA), 475 mL
013005MD	Orion DuraProbe 4-cell (K=0.475) conductivity/temperature sensor, MiniDIN connector
013016MD	Orion pure water 2-cell (K=0.1) conductivity/temperature sensor, MiniDIN connector
018020MD	Orion high range 2-cell conductivity sensor (K=10), MiniDIN connector
011008	Orion 100 μ S/cm conductivity standard, 5 x 60 mL
011007	Orion 1413 μ S/cm conductivity standard, 5 x 60 mL
011006	Orion 12.9 mS/cm conductivity standard, 5 x 60 mL
1010001	Orion conductivity verification resistor kit
083005MD	Orion polarographic DO sensor with calibration sleeve, MiniDIN connector
086030MD	Orion Auto-Stir BOD polarographic sensor with calibration sleeve, MiniDIN connector
087010MD	RDO optical DO sensor with optical cap, cal sleeve and guard, MiniDIN connector

Visit www.thermoscientific.com/water for a complete listing of all available Thermo Scientific Orion meters, electrodes, solutions and accessories.

thermoscientific.com/water

© 2015 Thermo Fisher Scientific Inc. All rights reserved. RDO is a registered trademark of In-Situ Inc. Microsoft, Windows and Microsoft Vista are registered trademarks of Microsoft Corporation. All other trademarks are the property of Thermo Fisher Scientific Inc. & its subsidiaries.

Water and Lab Products

North America

Toll Free: 1-800-225-1480
Tel: 1-978-232-6000
Info.water@thermofisher.com

Germany

Tel: (49) 6184-90-6000
info.water.uk@thermofisher.com

China

Tel: (86) 21-68654588
wai.asia@thermofisher.com

India

Tel: (91) 22-4157-8800
wai.asia@thermofisher.com

Singapore

Tel: (65) 6778-6876
wai.asia@thermofisher.com

Japan

Tel: (81) 045-453-9175
wai.asia@thermofisher.com

Australia

Tel: (613) 9757-4300
In Australia (1300) 735-295
InfoWaterAU@thermofisher.com

Thermo
SCIENTIFIC

A Thermo Fisher Scientific Brand