

Thermo Scientific Orion Star Plus Meter Enhancements

The Orion Star Plus meters have been enhanced to include autosampler capability, an increased number of datalog points, improved temperature displays and a new temperature calibration mode for each measurement parameter. This sheet contains information and instructions on the Star Plus meter enhancements.

Autosampler Capability

Benchtop Star Plus meters are compatible with the AutoTraction-500 autosampler. Refer to the *Thermo Scientific Orion Star Plus Meter and AutoTraction-500 Autosampler Interface, Setup and Operation Guide* for complete instructions on meter and autosampler functions.

Temperature Display

Star Plus meters allow the temperature to be viewed on individual measurement lines in addition to the temperature display on the top, left of the screen.

The 5-Star Plus display is shown in **Figure 1**. The 3-Star Plus and 4-Star Plus displays will have fewer measurement lines, depending on the measurement capabilities of the meter.

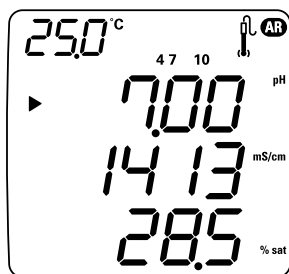


Figure 1: Star Plus Meter Display

To view the temperature for a measurement line:

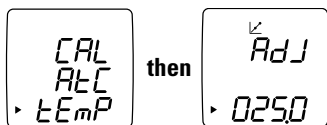
1. Press and hold the **measure** key until the meter displays the measurement mode.
2. Press the **line select** key to choose the top, middle or bottom display line. The arrow icon will point to the selected line.
3. Press the **up arrow** key to change the value on the selected line.
 - The top line can be changed to display pH (pH), millivolts (mV), relative millivolts (RmV), concentration (ISE), temperature (no icon) or a blank line.
 - The middle line can be changed to display conductivity ($\mu\text{S}/\text{cm}$ or mS/cm), total dissolved solids (mg/L), salinity (ppt), resistivity ($\text{M}\Omega\text{-cm}$), temperature (no icon) or a blank line.
 - The bottom line can be changed to display dissolved oxygen (% saturation), dissolved oxygen (mg/L), barometric pressure (no icon), sample temperature (no icon), electrolyte solution/membrane temperature (m) or a blank line.

Temperature Calibration

The temperature calibration mode of the Star Plus meter allows the temperature on each measurement line to be manually adjusted.

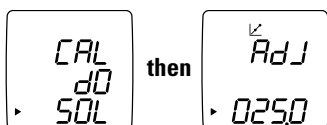
To calibrate the temperature for the pH/mV/RmV/ISE or conductivity lines:

1. In the measurement mode, press the **line select** key to choose the measurement line and then press the **up arrow** key until the temperature is shown for the selected line.
2. Press the **calibrate** key. The meter will display the screen shots to the left.
3. When the reading stabilizes, the arrow icon will flash. Enter the temperature by pressing the **up/down arrow** keys to adjust each digit and the **digits** key to move to the next digit.
4. Press the **calibrate** key to save the calibration.



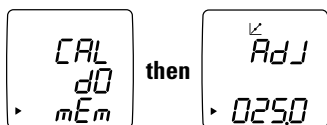
To calibrate the sample temperature for the DO line:

1. In the measurement mode, press the **line select** key to choose the bottom measurement line and then press the **up arrow** key until the sample temperature is shown (i.e. 25.0).
2. Press the **calibrate** key. The meter will display the screen shots to the left.
3. When the reading stabilizes, the arrow icon will flash. Enter the temperature by pressing the **up/down arrow** keys to adjust each digit and the **digits** key to move to the next digit.
4. Press the **calibrate** key to save the calibration.



To calibrate the electrolyte solution/membrane temperature for the DO line:

1. In the measurement mode, press the **line select** key to choose the bottom measurement line and then press the **up arrow** key until the membrane temperature is shown (i.e. 25.0m).
2. Press the **calibrate** key. The meter will display the screen shots to the left.
3. When the reading stabilizes, the arrow icon will flash. Enter the temperature by pressing the **up/down arrow** keys to adjust each digit and the **digits** key to move to the next digit.
4. Press the **calibrate** key to save the calibration.



Datalog and Calibration Log

All 3-Star Plus and the 4-Star Plus ISE meters have a 1000 point datalog. The 4-Star Plus pH/conductivity and pH/DO meters have a 750 point datalog. The 5-Star Plus meters have a 500 point datalog.

To enable the automatic recording of data into the datalog:

1. In the measurement mode, press the **setup** key.
2. Press the **up arrow** key until LOG is displayed on top line.
3. Press the **line select** key until the arrow icon points to the middle line and press the **up arrow** key until AUtO is displayed.
4. Press the **line select** key until the arrow icon points to the bottom line and press the **up arrow** key until On is displayed.
5. Press the **line select** key until the arrow icon points to the top line.
6. Press the **measure** key to save the parameter and return to measurement mode.

To view the datalog or calibration log:

1. In the measurement mode, press the **log view** key.
2. Press the **up arrow** key to select vIEW to display the datalog or CALv to display the calibration log.
3. Press the **log view** key. The meter will display the date/time screen. The log number will be on the top of the screen and the time, date and year the log was recorded will be on the top, middle and bottom display lines respectively. Press the **up/down arrow** keys to scroll through the log.
4. Press the **log view** key. The meter will display the data or calibration point associated with the selected date/time screen. Press the **measure** key to print the individual data point, press the **up/down arrow** keys to scroll through the log or press the **log view** key to return to the date/time screen.
5. To exit the log view mode, press the **log view** key until the meter displays the date/time screen and then press the **measure** key.

To send the datalog or calibration log to a printer or computer:

1. In the measurement mode, press the **log view** key.
2. Press the **up arrow** key to select SEnd to print the datalog or CALS to print the calibration log.
3. Press the **log view** key to send the selected data to a printer or computer.

Manual Conductivity Calibration

The manual calibration mode of the Star Plus conductivity meters allows the cell constant to be adjusted up to four decimal places. The manual calibration screen will display the cell constant on the top line, the conductivity value of the calibration standard on the middle line and CELL on the bottom line.

1. Prepare the conductivity cell according to the cell user guide, connect the cell to the meter, rinse the cell with deionized water and then place the cell into the conductivity standard.
2. In the measurement mode, press the **line select** key until the arrow icon points to the conductivity measurement line.
3. Press the **calibrate** key.
4. Change the cell constant by pressing the **up/down arrow** keys to adjust each digit and the **digits** key to move to the next digit. Adjust the cell constant value until the displayed conductivity value matches the conductivity value of the standard at the measured temperature.
5. Press the **measure** key to save and end the calibration.

NOTE: *If you do not start changing the cell constant within five seconds, the meter will automatically proceed to the AutoCal/DirectCal screen. Press and hold the measure key to abort the calibration and return to the measurement mode.*

BOD Probe Stirrer Control

Benchtop Star Plus DO meters now allow the measurement and stirring functions to be controlled by the Orion BOD AUTO-STIR probe, Cat. No. 086030MD. The stirrer button on the BOD AUTO-STIR probe can be pressed to start and stop measurement and stirring functions when the meter is in the AUTO-READ measurement mode.

Enhanced Printouts

The Star Plus meter printouts have been enhanced to include additional information. The pH and ISE calibration printouts now include average slope, slope between points and Eo per point. The DO printouts now include slope and membrane and solution temperatures.

5-Star BENCHTOP MULTI with ISE	
Meter S/n	D00079
SW rev	2.00
Method #	1
07-25-2007 18:15:00	
pH	7.00 pH
mV	-0.1 mV
Temperature	19.9 C
Slope	100.0 %
Calibration # 1	
Conductivity	266.9 uS/cm
Conductance	500 uS
Temperature	19.9 C
Temp. Coefficient	2.1 %/C
Cell Constant	0.475 /cm
Calibration # 1	
Concentration	1.60 mg/L
Saturation	38.3 % sat
Current	798.0 nA
Temp. Solution	24.9 C
Temp. Membrane	24.9 C
Barometric Pressure	759.2 mmHg
Salinity Correction	0.1 ppt
Slope	11.8 nA/%sat
Calibration # 1	
Operator	_____
Sample #	_____

Figure 2: Example Measurement Printout

3-Star BENCHTOP PH	
Meter S/n	B00090
SW rev	2.00
Method #	1
07-30-2007 12:45:00	
Calibration # 1 PH	
Point 1	
pH	4.01 pH
mV	177.0 mV
Temperature	25.0 C
Cal. Type:	Auto
Point 2	
pH	7.00 pH
mV	0.2 mV
Temperature	25.0 C
Cal. Type:	Auto
Point 3	
pH	10.01 pH
mV	-178.0 mV
Temperature	25.0 C
Cal. Type:	Auto
Slope 1	98.1 %
Slope 2	99.2 %
Avg. Slope	98.7 %
Eo 1	0.1 mV
Eo 2	0.0 mV
Eo 3	0.2 mV
Operator	_____

Figure 3: Example Calibration Printout

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