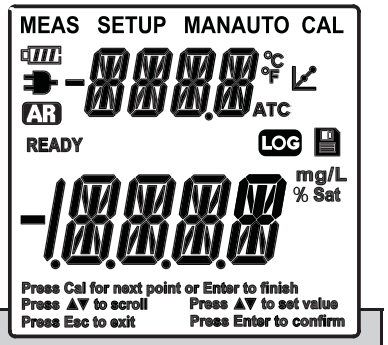
Display Information



Display Icon	Description
MEAS	Indicates that the meter is in the measurement mode.
SETUP	Indicates that the meter is in setup mode.
CAL	Indicates that the meter is the calibration mode.
MAN	Shown when a manual calibration (Winkler titration) is being done.
AUTO	Shown during water-saturated air calibration. Default setting.
	Shows the battery status (more bars = more power remaining). Blinks when power is low and the battery needs to be changed. (Batteries included and factory-installed with the portable meter Orion Star A123 DO meter.)
	Shown when the meter is running on AC power. (Adapter included with the benchtop meter Orion Star A113 DO meter.)
AR	Shown when the meter is on AUTO-READ mode. Default setting. AR and unit of measurements will blink until the reading is stable. When the reading is stable it is held on the screen and AR is lit. Press measure (esc) to take a new reading.
READY	Unit of measurement will blink until the reading is stable. When the reading is stable, READY is lit.
	Appears during and after a calibration has been performed.
	Displayed when a reading is stored into the memory.
LOG	Displayed when viewing stored readings.
Secondary display	Shows temperature reading in measurement mode and setup menu in setup mode.
Primary display	Measured value in selected mode.
Instructions	Located below the primary display. These phrases aid in the setup menu and calibration modes.

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Water Analysis Instruments
www.thermoscientific.com/water

North America
166 Cummings Center
Beverly, MA 01915 USA
Toll Free: 1-800-225-1480
Tel: 1-978-232-6000
info.water@thermo.com

Netherlands
Tel: (31) 033-2463887
info.water.uk@thermo.com

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

India
Tel: (91) 22-4175-8800
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) 735-296
InfoWaterAU@thermofisher.com

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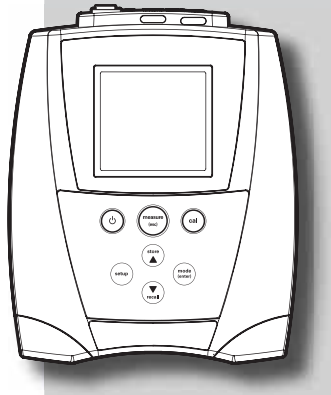
English

DO

Thermo Scientific Orion Star A113 Benchtop & Star A123 Portable DO Meters

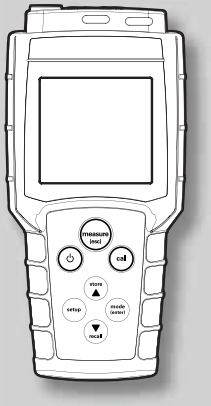
Instruction Sheet

Preparation



1. Power source:
   a. Power adapter (included with Orion Star A113 benchtop DO meters, sold separately for Orion Star A123 portable DO meters) – Select the appropriate wall socket plug. Slide off the clear plastic cover, and slide on the plug plate into the groove on the back of the adapter.
   b. Batteries (factory installed on Orion Star A123 portable DO meters, sold separately for Orion Star A113 benchtop DO meters) – Select four AA batteries. Confirm that the meter is off and remove the battery compartment cover. Insert batteries as shown in the battery compartment housing.
2. Prepare the DO probe according to the probe instructions. In general:
   a. Unscrew the membrane cap from the DO probe, fill the membrane cap about ¾ full with polarographic electrolyte solution and screw the membrane cap onto the DO probe.
   b. Connect the DO probe to the meter and allow the probe to polarize for about 30 to 60 minutes.

   Note: *A DO reading of zero and no change in temperature indicates that the DO probe is not fully connected to the meter. Disconnect the DO probe and then firmly reconnect the DO probe to the meter.*



3. Prepare the calibration sleeve or BOD bottle.
   a. For the calibration sleeve, remove the cap from the sleeve and remove the sponge from the cap. Wet the sponge with distilled water and squeeze out excess water. Reassemble the calibration sleeve and insert the DO probe.
   b. For a BOD bottle, fill the bottle with about 50 mL of distilled water. Insert the DO probe into the BOD bottle. Use a Thermo Scientific Orion BOD bottle adapter if the DO probe does not fit directly into the bottle. Make sure that the probe is suspended about half an inch above the distilled water and there is no water on the surface of the DO probe membrane.
4. Connect the appropriate item as labeled on the meter and as shown in Figure 1.

Overview

1. To turn on or off the meter, press ⏻.
2. To exit any meter function, press measure (esc) to return to the measurement mode.
3. The meter mode is shown at the top of the meter:
   MEAS – for measurement mode
   SETUP – for setup mode
   CAL – for calibration mode
4. The meter can be calibrated using water-saturated air or using the Winkler titration method for a manual calibration.
5. Press mode (enter) to switch between reading in % saturation, mg/L, solution temperature or membrane temperature. ("m" will appear in front of the membrane temperature reading.)

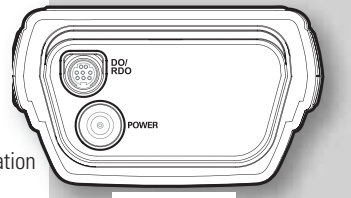


Figure 1

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Entering Barometric Pressure

Dissolved oxygen readings are dependent on barometric pressure. This needs to be entered manually as mm Hg. 1 mm Hg = 0.03937 inch Hg = 1.3332 hPA (mBar) = 0.01934 PSI.

1. In DO measurement mode, press **setup**.
2. Press mode (enter) three times so that the top line reads "PRES".
3. Press store ▲ or ▼ recall to enter the barometric pressure in mm Hg.

   Note: *Holding the button down will make the value change faster.*
4. Press mode (enter) to save configuration and measure (esc) to return measurement mode.

Entering Salinity Correction Value

Since the presence of dissolved salts limits the amount of oxygen that can dissolve in water, the correction value can be manually entered. The meter default has a salinity correction factor of 0. If this value needs to be changed, enter the salinity of the sample in parts per thousand (ppt)

1. In DO measurement mode, press **setup**.
2. Press mode (enter) four times so that the top line reads "SALT".
3. Press store ▲ or ▼ recall to enter the salinity in ppt.

   Note: *Holding the button down will make the value change faster.*
4. Press mode (enter) to save configuration and measure (esc) to return measurement mode.

DO Calibration using Air

1. Press mode (enter) to display the unit "% Sat" or "mg/L" in DO mode.
2. Make sure the DO probe is connected to the meter and fully polarized.
3. Prepare the calibration sleeve or BOD bottle. Insert the DO probe and wait five minutes for equilibrium. Press (cal).
4. "CAL" will appear in the upper right of the display. Wait for "READY" to appear and % Sat to stop blinking. The meter will display 102.3 % saturation and will proceed to the measurement mode.

DO Measurement

1. Check the barometric pressure and if needed, change the value for barometric pressure correction in setup menu 1.0.
2. Press mode (enter) to display DO readings in % saturation or mg/L (units of measurement).
3. Rinse the DO probe with distilled water and blot dry. Place into the sample and stir gently.
4. If the meter is in AUTO-READ mode (meter default), press measure (esc).
   If the meter is in continuous read mode, the meter will immediately start taking readings.
   Record the DO result and temperature of the sample when "READY" is displayed and the unit of measurements stops blinking.

   Note: *If in AUTO-READ mode and memory storage is enabled, the reading will automatically be stored when the "AR" appears.*
   If in continuous read mode and memory storage is enabled, press store ▲ to store into the meter's memory.
5. Remove the DO probe from the sample, rinse with distilled water and blot dry.
   To continue taking measurements, place the probe into the next sample, stir gently and repeat step 4.
6. When finished measuring all samples, store probe according to the probe instructions.

DO Calibration Selection

This meter can be calibrated using water-saturated air or the Winkler titration method for a manual calibration. Air calibration is the default setting on the meter. For calibration using Winkler titration, refer to the user reference guide on the included CD.

1. In DO measurement mode, press **setup**.
2. Press mode (enter) five times so that the top line reads "CALT".
3. Press store ▲ to select the calibration type as AIR for water-saturated air calibration or MAN for a manual calibration (Winkler titration).
4. Press mode (enter) to save configuration and measure (esc) to return measurement mode.

Read Type Selection

1. In measurement mode, press **setup**.
2. Press store ▲ in setup until "4.0" is shown on the top line and "READ" is shown on the lower line. Press mode (enter).
3. Press store ▲ or ▼ recall to select the measurement mode:
   CONT = Continuous
   AUTO = AUTO-READ™
4. Press mode (enter) to save selection. Press the measure (esc) key to return to measurement mode.

Memory Feature

This meter stores up to 50 readings.
To enable memory storage:

1. In measurement mode, press the "Setup" key.
2. Press store ▲ to show "5.0" on the top line and "LOG" on the lower line. Press mode (enter).
3. Press store ▲ to show "ON" on the second line. Press mode (enter) to save selection.
4. Press measure (esc) to return to measurement mode.

In Auto-Read mode, readings are automatically stored into memory after each stable reading (when "AR" stops blinking and "READY" appears).

In continuous read mode, when the reading is stable and "READY" appears, press store ▲ to store into the meter's memory.

Viewing Stored Readings

1. In measurement mode, press ▼ recall.
2. Press store ▲ or ▼ recall to scroll through the memory points.
3. Press mode (enter) to review the reading stored at that point.
4. Press measure (esc) key to return to measurement mode or mode (enter) to view additional stored readings.

Keypad Information

measure (esc)	*In the measurement screen:* Press to take a measurement. *In the setup screen:* Press to escape the setup menu. *In the calibration screen:* Press to abort calibration.		
⏻	Press to turn the meter on or off.	mode (enter)	*In the measurement screen:* Press to switch between modes. *In the setup screen:* Press to confirm the selection.
cal	Press to enter the calibration mode.	setup	Press to enter the setup mode.
store ▲	*In the measurement screen:* Press to store the data on the screen in continuous read mode and with data logging on. *In the setup screen:* Press to scroll up in the list of options.	▼ recall	*In the measurement screen:* Press to see the stored data. *In the setup screen:* Press to scroll down in the list of options.

For additional setup menu information, refer to the reference guide. The reference guide is on the included CD and available at www.thermoscientific.com/water.

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